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THE INTELLIGENCE OF
CONTINUATION-SCHOOL
CHILDREN
IN MASSACHUSETTS

BY

L. THOMAS HOPKINS, ED.D. (HARVARD)

Professor of Education, University of Colorado



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TO MY WIFE

**WITHOUT WHOSE ENCOURAGEMENT AND
COOPERATION THIS BOOK WOULD
NEVER HAVE BEEN WRITTEN**

PREFACE

It was nearly a decade ago when Thorndike pointed out that large numbers of pupils were being eliminated annually from our public schools. Since that time studies have shown that many of these students leave school to go to work and numbers of investigations have been made to determine why they seek employment rather than remain in school. The usual reasons assigned are: (1) the failure of the school to make a vital appeal; (2) the failure of the school to train in the means of a livelihood; (3) discouragement at the poor results obtained in school subjects; (4) genuine desire to go to work; and (5) economic necessity. These reasons may have been satisfactory ten years ago, but the past few years have given us two new factors which shed more light upon the situation. The first is the passage of laws, in many states, making it compulsory for pupils who leave school between certain ages, usually fourteen to sixteen or sixteen to eighteen, to attend continuation schools. This means that all pupils going to work during these ages are under school control and accessible for investigation purposes. The second is the development of group intelligence tests to the point where they can be given to relatively large numbers at one time with the assurance, for at least group comparisons, of a reasonably accurate result. The author has used these two newer methods of approach to the problem, for by giving intelligence tests to continuation-school pupils and comparing their results with those of groups of pupils of the same age who have remained in the regular school, he has attempted to find out whether a significant relationship exists between intelligence and leaving school to go to work. The results have been used to indicate desirable changes in continuation-school practice to meet the needs of this group of pupils. A sug-

gested program for the reconstruction of our elementary school system is also given in order that those pupils who are going to work at an early age may be trained in those qualities which will make for success rather than those which make for failure.

The author feels greatly indebted to the many superintendents of schools, directors of continuation schools, principals of elementary, junior and senior high schools who have coöperated so readily in granting permission for this study to be carried on in their school systems and who have arranged schedules of pupils and teachers so as to cause the smallest amount of interruption to the regular school work and give the greatest convenience to the author. To mention all by name would be a great pleasure, but the limitation of space will not permit. Among those who have been of great service are Professor E. A. Shaw and Mr. E. A. Lincoln of the Psycho-educational Clinic of the Harvard Graduate School of Education, whose personal interest in the work has been of much value. An especial acknowledgment is due to my colleagues, Professor Harry M. Barrett, Director of the College of Education of the University of Colorado, and Associate Professor J. H. Shriber, for reading the proof of the entire book. The author feels his deepest sense of gratitude, however, to Professor Walter F. Dearborn of the Graduate School of Education, Harvard University, under whose wise direction this investigation was pursued and to whom he owes much for the inspiration to carry the work to completion. Whatever merits this study may have are due in a large measure to the unusual coöperation which the author has received from all sources; whatever defects it may have are his own.

L. THOMAS HOPKINS

UNIVERSITY OF COLORADO
BOULDER, COLORADO
June 1, 1924.

CONTENTS

INTRODUCTION, BY WALTER F. DEARBORN	xiii
---	------

CHAPTER I

THE AIM, MATERIALS, METHOD, AND SCOPE OF THIS INVESTIGATION	3-12
---	------

Reasons for undertaking this investigation. — Intelligence test used. — Method of administering the tests. — Standards for evaluating the results. — Scope.

CHAPTER II

THE RESULTS: CASE I	13-22
-------------------------------	-------

Reasons for the selection of this case. — Distribution of continuation-school scores. — Distribution of regular-school scores. — Median-score differences. — Median mental-age differences. — Median intelligence-quotient differences. — Differences in the range of the middle fifty per cent of the cases. — Conclusion.

CHAPTER III

THE RESULTS: CASE II	23-31
--------------------------------	-------

Reasons for the selection of this case. — Methods of selecting the regular-school group. — Distribution of continuation- and regular-school scores. — Median-score differences. — Median intelligence-quotient differences. — Differences in the range of the middle fifty per cent of the cases. — Conclusion.

CHAPTER IV

THE RESULTS: CASE III	32-39
---------------------------------	-------

Reasons for the selection of this case. — Distribution of continuation- and regular-school scores. — Median-score differences. — Median mental-age differences. — Median intelligence-quotient differences. — Differences in the range of the middle fifty per cent of the cases. — Conclusion.

CHAPTER V

THE RESULTS: CASE IV	40-48
--------------------------------	-------

Reasons for the selection of this case. — Methods of selecting the regular-school group. — Distribution of continuation- and regular-school scores. — Median-score differences. — Mental-age differences. — Median intelligence-quotient differences. — Differences in the range of the middle fifty per cent of the cases. — Conclusion.

CHAPTER VI

A COMPARATIVE AND TOTAL ANALYSIS 49-66

Racial and industrial significance. — Reasons for small median-score differences between 14- and 15-year-olds in continuation schools. — Reliability of median scores of regular-school group. — Reasons for large median-score differences between 14- and 15-year-olds in regular school. — Comparative median-score differences. — Comparative median mental-age differences. — Comparative intelligence-quotient differences. — Comparative analysis of scores of the total continuation-school and total regular-school groups. — Median-score differences, continuation-school, regular-school, and combined groups. — Comparison of median mental ages and reliability of findings. — Comparison of median intelligence quotients. — Difference in the range of the middle fifty per cent. — Conclusion.

CHAPTER VII

SEX DIFFERENCES 67-94

Differences in mental traits. — Differences in school achievement. — Differences in general intelligence. — Reliability of Dearborn Tests as a measure of sex differences. — Sex differences in continuation school. — Sex differences in regular school. — Reasons for superiority of boys. — Reasons for greater sex differences in continuation than in regular schools. — Relationship between the sexes in continuation and regular schools. — Educational implications. — Conclusion.

CHAPTER VIII

AN ANALYSIS OF VARIOUS REASONS FOR LEAVING SCHOOL . . . 95-107

Reasons given by pupils for leaving school. — Analysis of the economic reason. — Analysis of the disciplinary reason. — Analysis of lack of ability as a reason for leaving. — Analysis of genuine desire to work as a reason for leaving. — Retardation and acceleration in elementary and high schools. — Conclusion.

CHAPTER IX

INVESTIGATIONS BEARING ON THE RELATION OF INTELLIGENCE TO SCHOOL ELIMINATION 108-116

Introduction. — Dearborn's investigation in Wisconsin. — Proctor's work in California. — Dr. Ruth Clark's study of continuation-school pupils in New York City. — Count's findings in Bridgeport, Connecticut. — Plenzke's results in two cities in Wisconsin. — Young's investigation in the Opportunity School, Denver, Colorado. — Conclusion.

CONTENTS

xi

CHAPTER X

CONCLUSIONS 117-125

Continuation-school pupils a highly selected group. — School is not making provision for its brightest group. — School system a common mould. — Economic factor not an important cause of leaving school. — School system defeating its own ends.

CHAPTER XI

SUGGESTIONS FOR IMPROVEMENT 126-132

Publicity needed. — Reclassification through intelligence tests. —
New school curriculum needed. — Vocational guidance needed. —
School must train in success.

INTRODUCTION

It is now generally recognized that marked deviation from the normal in the intelligence of school children calls for differentiation, or at least some modifications, in the methods, materials, and objectives of instruction. Special classes have been established for mentally deficient children, and more recently either special classes or special provisions for the exceptionally gifted children. Even smaller deviations are being taken account of. The encouraging of children with intelligence quotients of much less than 100, as determined by the currently used intelligence tests (with all their shortcomings), to look forward to successful courses in the usual academic subjects of college, or of even the senior high school, has been shown to be, with rare exceptions, unwise educational guidance. Dr. Hopkins's investigation raises similar questions in regard to the instruction and educational objectives of continuation-school children. The investigation discovers an important educational problem, and contributes much toward its solution. It also incidentally illustrates the usefulness for group studies of the recently devised group-tests of intelligence. In the representative communities studied, the intellectual development of continuation-school pupils is, on the average, over two years less than that of the regular-school pupils of the same age; about a quarter only of the continuation-school children exceed the twenty-five percentile of the regular-school distribution (in terms of mental ages), and a smaller proportion reach the median or average of the latter groups.

Not all the difference between these groups can be attributed to heredity. It is in part the effect of schooling. The

intellectual development of some of these children (how many, no one knows) has suffered because the schools have not provided the right sort of training for them. The usual academic training has failed where there is good reason to believe training of a different sort might have succeeded.

Prevocational and trade classes would have helped, but admission to such classes usually depends on the completion of at least the work of the sixth grade, and that is just what these children have not been able to do. With the remarkable increase in recent years in the enrollment of other junior and senior high schools, the enrollment of the trade and technical high school has, in many communities, remained static. If these schools would come down from their high places and suit their instruction to the needs of this group, their ranks might be filled. The sciences basic to the art of plumbing are numerous, but they should not estop a plumber's helper in the making.

Whatever the merits of this suggestion,— and the writer is aware of some of its complications,— here is a group of children at least half of whom have been seriously retarded because of their inability to learn well what is ordinarily taught in the fifth and sixth grades. Is there no other alternative to keeping them in these and lower school grades until they are fourteen years of age? And should not these considerations give pause to those who, without providing measures to meet existing difficulties, advocate the keeping of these children in school, by legal measures, for a year or two longer?

WALTER F. DEARBORN

HARVARD UNIVERSITY

**THE INTELLIGENCE OF
CONTINUATION-SCHOOL CHILDREN
IN MASSACHUSETTS**

CHAPTER I

THE AIM, MATERIALS, METHOD, AND SCOPE OF THIS INVESTIGATION

DURING the fall of 1918, most of the schools of New England were closed owing to the influenza epidemic. The writer decided that this was an ideal time to take a vacation in the northern Maine woods. One day, while driving through the forest far from any habitation, he came upon a boy trudging along the road. He gave the boy a lift to the nearest village and was rewarded with the following story.

John — we will call this his name — was born and reared in one of the many lumber-camps located far up in the Maine woods, remote from the usual channels of civilization. He was now twelve years of age, but had had no training except that secured through the ordinary contacts of camp life. In response to the query, "Where are you going?" he stated: "To the town of C——." When asked why, he replied: "I thought it about time that I had my chance at an education the same as other boys have."

The writer began to wonder whether there is not some sound educational philosophy in the boy's phrase, "chance at an education." Can it be possible that a boy entering the public-school system, which he is compelled by law to attend, is "taking a chance" of finding a curriculum adapted to his individual needs, a method of teaching which he can understand, and an opportunity to discover and prepare for his life-work? Unfortunately one has to conclude that such is the case, and that the degree of chance diminishes with the ability of the pupil to conform to a uniform, stereotyped, artificial life.

In recent years, however, various attempts have been made to remove some of this "chance" by the development of scientific measures with which to evaluate the results of public education. Nothing is contributing more toward this end, at the present time, than the careful giving and wise interpretation of the results of intelligence tests. The writer proposes to use these newer measures and methods of comparison to determine whether a significant relationship exists between the intelligence of school children and their elimination from school for the purpose of going to work.

REASONS FOR UNDERTAKING THIS INVESTIGATION

There were three major reasons for undertaking this investigation. *First*, this important educational problem had never before been studied. This was due primarily to the lack of efficient and sufficiently objective¹ tests with which to measure intelligence, as these are a development of the last two decades. It was in 1905 that Binet and Simon assembled and tried out the material which formed their first intelligence test. Three years later they revised and standardized it. In 1911 Goddard brought out an American translation of their work. It was soon found, however, that in racial inheritance and training the French children differed so widely from American children that the tests in the original form were unreliable. In 1913 Terman adapted the Binet-Simon tests to American conditions by introducing some new materials and rearranging others so as to secure better grading. This is now known as the Stanford-Binet.

While this was a great step in advancing intelligence testing, it was still a slow, individual process. During the World War, however, Otis, utilizing various methods and materials in current use, including the Binet and with additions of his

¹ These are definite uniform measures, not subject to variation of result due to the individual opinions of the users.

own, developed a group test for adults.¹ It has been since that time, or within the last three years, that group examinations have been adapted to children. Without these, this investigation would have been almost impossible because of the difficulty of securing enough cases by the individual method.

Again, this question had not been studied, owing to the great difficulty in following up pupils after they had once left school. School committees had neither authority nor funds to carry on the work of locating and assembling those at work for the purposes of a mental examination. For the investigator to gather this preliminary evidence would have been almost a superhuman task. Although in 1913 the Massachusetts Legislature passed Chapter 805, authorizing towns and cities to establish continuation schools which working boys and girls from 14 to 16 years of age must attend four hours per week, Boston was the only place in the Commonwealth which took advantage of this act.²

There was also a failure to recognize the significance of the problem. In pre-war times the number of 14-to-16-year-old children employed in Massachusetts was about 35,000. By June 30, 1917, this figure had jumped to 42,000, and a year later the number was estimated at 50,000. This enormous increase resulted in the passage of a compulsory continuation-school law which will be explained below. No attempt was made, however, to investigate scientifically the causes of this day-school mortality. Instead, there were given the customary arguments of (1) the failure of school work to make a vital appeal; (2) the failure of the school to train in the means of earning a livelihood; (3) discouragement at the poor results obtained in school subjects; (4) genuine desire to go to work;

¹ This was the first group test devised, and furnished the basis for the test subsequently called Army Alpha. It was composed of eight separate tests for: following directions, arithmetical problems, practical judgment, synonyms-antonyms, disarranged sentences, number series completion, analogies, and information.

² Eighty-first Annual Report of the Massachusetts Board of Education, p. 244.

and (5) economic necessity. That one fundamental cause might underlie all of the above was not proposed, and is not now generally accepted.

This investigation was undertaken, in the *second* place, because through the continuation school it is now possible to reach pupils who leave school to go to work. In 1919 the Massachusetts Legislature passed Chapter 311, which provided that all communities employing 200 14-to-16-year-old minors must give them at least six hours per week in school, provided these communities accepted the law by the adoption of a referendum at the state election of November 4, 1919. In September, 1920, 44 of these continuation schools were established in the larger cities and towns of the Commonwealth. It was now possible, in these communities, to find, in the continuation school once a week, every person between the ages of 14 and 16 who had left school to go to work. The problem was, then, to give an intelligence examination to these pupils.

In the *third* place, the writer had a very definite conviction that pupils left school to go to work for the reason that they did not have sufficient intelligence to do the things which the school required. This belief had gradually grown during nearly ten years of experience in school supervision, and reached its culmination in 1920, when, as superintendent of schools in a Massachusetts town, he had to organize a continuation school under the compulsory provisions of the act stated above. A year of experience with this school left no doubt in his mind as to the mental inferiority of those who were at work compared with those of the same age in school. A discussion of this belief with various school men brought out the fact that the writer's opinion was held by a very small minority. The general view was that pupils who left school to go to work were as intelligent as those who remained in school, and that the one big reason why they did not keep on

was the economic factor in the home, which made it necessary that they contribute some income to the family budget; in other words, the educational sacrifice of the individual to meet the needs of food, shelter, and clothing for the family group. The writer decided that argument was of little use. Facts were needed. He therefore began this investigation.

INTELLIGENCE TEST USED

The test used in this study was the Dearborn General Intelligence Test, Series II.¹ This mental examination consists of ten separate tests for: (1) picture sequence; (2) word sequence; (3) form discrimination; (4) opposite completion; (5) memory ladders; (6) picture symbols; (7) mazes; (8) disarranged proverbs; (9) faulty pictures; and (10) number problems. This scale had been previously verified as to its reliability for the measure of intelligence.² It was selected for this purpose for four reasons. *First*, it lays less emphasis on school training than do other general intelligence tests, most of which are derivatives of Army Alpha.³ This was especially important in the investigation at hand for: (1) there were in the continuation schools a large number of pupils either foreign-born themselves or of foreign-born parents; and (2) many pupils left regular school with little or no training beyond that required for graduation from the fourth grade. In both of these instances it would have been exceedingly unfair to give an examination which laid particular emphasis upon the side of language and school training.

Second, speed is not a vital factor, the time set for each test being long enough to give even the slowest the opportunity to

¹ A copy of this, together with mental age standards, methods of giving and scoring, can be secured from J. B. Lippincott Company, Philadelphia, Pa.

² See Dearborn, W. F., and Lincoln, E. A., "Revising the Dearborn Intelligence Examination"; *Journal of Educational Psychology*, January, 1923.

³ For examples of this see the Otis, National, Haggerty, and Terman Intelligence Tests, all of which may be secured from the World Book Company, Yonkers-on-Hudson, New York.

do all they can. There is some difference of opinion as to the importance of speed in mental testing.¹ Dr. Mark A. May conducted an examination with the Alpha test on 510 cases in the army, to determine the significance of the time element. He found that, when the time was doubled, the mean percentage of gain in total score over that made in regular time was as follows:²

Location. Single Time	Mean Percentage of Gain Double Time
1st quartile	17
2d quartile	31
3d quartile	34
4th quartile	36

This means that those who were in the first quartile of the group on single time made an average gain of 17 per cent by double time, while those in the fourth quartile averaged a gain of 36 per cent. The fact that the average gain in total score of all persons below the first quartile was 33 per cent, or one third of the original score, and that the greatest relative gain was in the lowest quartile, seems to show that the time factor on any intelligence examination must be long enough to allow the slowest persons to do all they can.

The test used in this investigation was constructed with this idea in mind. That the very slowest were not hampered by the speed element was noticed at all times, and was periodically checked, to make sure, by asking how many had done all they possibly could; when all hands would go up. In one particular instance, in examining a very low grade continuation group, the writer, after calling time, said, "All those who have not done all they can will be allowed another minute."

¹ See Terman, L. M., "The Great Conspiracy"; *New Republic*, December 27, 1922; and Lipmann, Walter, "The Great Confusion"; *Ibid.*, January 3, 1923.

² "Psychological Examining in the United States Army"; *Memoirs National Academy of Sciences*, XV. Compiled from data given on page 416.

Only one pupil did more, and she answered two questions of the opposite-completion test incorrectly. It was discovered later that this girl was not in a job, but was sent to the continuation school daily from a special class, — where she had made much trouble for the teachers, — in the hope that she might get something out of the domestic-science work.

Third, the psychological arrangement appeals to the interests of pupils and mitigates the inhibiting responses which are usually associated with the word test. The writer believes this to be one of the very strong points of this series of mental examinations. A particular instance will be cited to show what is meant. In one continuation school the examiner was introduced to the group by the principal with the words, "We have with us this morning Mr. — from the Harvard Graduate School of Education, who is going to give you a test." Immediately a general sigh and murmur arose. One pupil, daring to voice the sentiment of the group, said, "How can we take a test when we have not had time to prepare for it?"

The examiner, on being presented, assured the group that they were not to be tested on their school-work, as what they would be asked to do was not geography, history, language, arithmetic, reading, or any other school subject. This relieved the situation immediately; but the final triumph came when the leaflet was opened to Test I, the picture sequence. The examiner said: "You can see now why I told you this was not an examination of your school-work. Have you ever had school tests which consisted of pictures?" The reply being in the negative and a general laugh being enjoyed, everybody began work immediately. Had the first examination been of a different nature, this favorable psychological effect would have been lost.

Fourth, the standards for the different scores were deter-

mined by the scientific selection of thousands of cases.¹ Mental ages are computed from the standards given for the scores. If the latter are not reliable, then the mental ages are not accurate; and if the mental ages are not accurate, the intelligence quotients are affected. As the writer contemplated using both the mental age and intelligence quotient of each pupil, the reliability of the standards was a vital point in determining the selection of the intelligence examination to be used.

METHOD OF ADMINISTERING THE TESTS

The method of administering the tests was very carefully safeguarded. Over ninety per cent were given by the writer, who had had previous experience in testing several thousand children. The others were handled by examiners who had been especially trained for the work. The directions, as given in the printed manual, were followed exactly. All the scoring was done by two persons with much previous experience in correcting this particular test. Close coöperation was given, with frequent checking of each other's work, to eliminate irregularities and secure uniformity. In all cases of reasonable doubt the benefit was given to the pupil.

The blanks were changed in one respect so as to elicit information from pupils that would enable us to make certain comparisons and correlations. Under "grade" and "school," pupils in continuation school gave the grade and school which they last attended in the regular day school before going to work; pupils in school below the high school gave the grade and school they were then attending; while pupils in high school gave the grade and name of school from which they graduated before entering high school.

¹ Dearborn, W. F., and Lincoln, E. A., "How the Dearborn Intelligence Examination Standards were Obtained"; *Journal of Educational Psychology*, May, 1922, pp. 295-298.

STANDARDS FOR EVALUATING THE RESULTS

The question of securing proper standards for the evaluation of the results of the continuation pupils was a vital one. Since it is impossible to measure absolute mental ability, because no intelligence scale has been, or probably can be, constructed which will give an absolute zero point to start from, and since any group of individuals reveals many different grades of mental ability, the general level of intelligence of any group must be measured by standards derived in one of two ways: (1) those obtained from the group itself; or (2) those secured from other groups of individuals whose intelligence rating is known. The intelligence of continuation-school children is a problem which has not been previously studied, and continuation-school pupils present a selected group of individuals who have heretofore not been measured. We do not have norms from a similar group with which to compare our results. It was decided, therefore, that a reliable index of the general intelligence of this special group would be its central tendency, or median score, and the range of the middle 50 per cent, in comparison with the same data for an unselected¹ group of 14-to-16-year-old pupils *in regular school* in the same community where the continuation school was located. Furthermore, it was decided that the *most* reliable measure would be the above-mentioned comparisons in relation to the entire number of continuation- and regular-school pupils tested in all the cities studied, as no really unselected group at these ages can be secured without including those who have left school to go to work.² Consequently the

¹ This means a random or choice sampling. A group of this sort would include approximately 25 per cent of superior intelligence, 50 per cent of average intelligence, and 25 per cent of inferior intelligence.

² It is interesting to note that Mr. Cyril Burt, Psychologist for the London County Council, has reached the same conclusion. He proposes to test the intelligence of pupils in the London Continuation Schools and combine their scores with those of pupils of the same age in regular school, in order to secure a real unselected group as a standard of comparison for both continuation- and regular-school pupils.

same intelligence examination under the same conditions was given in each community to both the continuation- and regular-school groups.

SCOPE

The scope of this study is confined to *all* the pupils in five continuation schools located in as many different cities and towns in Massachusetts. The total number of cases involved is 1200. The number of pupils 14 to 16 years old, in regular schools, tested and used for comparative purposes, is 1980.

CHAPTER II

THE RESULTS: CASE I

REASONS FOR THE SELECTION OF THIS CASE

CASE I represents all the continuation-school pupils in two nearly contiguous communities. The number of cases is 265, divided as follows: 14-year-olds, 55, and 15-year-olds, 210. Those examined for comparative purposes represent *all* the 14-to-16-year-olds in the public schools of one of these communities. The total is 245, of whom 114 are 14-year-olds and 131 are 15-year-olds. This case was selected for study for three reasons: (1) the industries represented in these communities were largely automobile-body and boot and shoe, both of which usually employ a higher type of skilled workman; (2) the continuation-school group was fairly homogeneous, which would eliminate objections that might be raised were large numbers of different racial groups represented; (3) it was possible to test all the pupils of these ages in public school in one of these communities, and it was thought that this would give a better indication whether the investigation should be continued further, than would a small selection from a large community.

DISTRIBUTION OF CONTINUATION-SCHOOL SCORES

The general results are indicated first of all in Table I, which is a distribution of the scores of the 14- and 15-year-olds in continuation school, together with the percentage of the total group in each class interval. Two points in regard to this need explanation. *First*, the small number of 14-year-olds in relation to 15-year-olds. This is due to: (1) the general business depression, making it difficult for beginners to se-

cure positions: consequently, by law they are full-time pupils in regular day schools; (2) the fact that, other things being equal, an employer prefers the older pupils; (3) many of the 15-year-olds had had a full year of experience, and for this reason were kept and given positions formerly held by 14-

TABLE I
DISTRIBUTION OF SCORES OF PUPILS IN CONTINUATION SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
200-190 .....	..	...	2	.9
190-180 .....	..	...	1	.47
180-170 .....	..	...	1	.47
170-160	1	1.8	1	.47
160-150 .....	..	...	7	3.29
150-140	1	1.8	6	2.82
140-130	2	3.6	12	5.64
130-120	7	12.6	11	5.17
120-110	3	5.4	21	9.87
110-100	4	7.2	21	9.87
100-90	8	14.6	20	9.4
90-80	5	9.	26	12.22
80-70	10	19.	27	12.69
70-60	6	10.8	14	6.58
60-50	3	5.4	22	10.34
50-40	3	5.4	7	3.29
40-30	2	3.6	5	2.35
30-20 .....	..	...	6	2.82
	55		210	

NOTE. This table reads as follows: 3 pupils out of 55, or 5.4 per cent, of 14-year-olds scored between 110 and 120; 12 out of 210, or 5.64 per cent, of 15-year-olds scored between 130 and 140.

year-olds. This condition, for the same reasons, will be seen in all the other cases discussed below. *Second*, in the case of 14-year-olds, there are two modes, one at 70 to 80 and another at 120 to 130. A bimodal distribution of this sort usually shows that two distinct underlying factors are being measured. This evidently is true in this instance. An analy-

sis of the work done by the seven cases scoring between 120 and 130 showed that five of them at least were in positions, (1) paying wages beyond the level of usual juvenile occupations and requiring rather more than the usual order of intelligence; or (2) as apprentices in a definite adult vocational trade.

The 15-year group is fairly regular, with the exception of the four cases at the upper end; of these, the two highest scores

TABLE II
DISTRIBUTION OF SCORES OF PUPILS IN REGULAR SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
210-200	1	.9	2	1.5
200-190	2	1.8	..	..
190-180	2	1.8	7	5.3
180-170	1	.9	9	6.8
170-160	5	4.5	10	7.6
160-150	6	5.4	13	9.8
150-140	8	7.2	15	11.4
140-130	15	13.5	17	12.9
130-120	21	18.9	17	12.9
120-110	18	16.2	11	8.3
110-100	12	10.8	10	7.6
100-90	14	12.6	7	5.3
90-80	6	5.4	11	8.3
80-70	3	2.7	1	.76
70-60 .....	..	...	1	.76
	114		131	

NOTE. This table reads as follows: 5 pupils out of 114, or 4.5 per cent, of 14-year-olds scored between 160 and 170; 7 out of 131, or 5.3 per cent, of 15-year-olds scored between 180 and 190.

were made by boys both of whom were in the first year of high school and were expelled for disobedience to rules, one for inveterate cigarette smoking. The next case was that of a boy who also was in the first year of high school. He could not get along with his teachers, although his academic standing was good. He left rather than be dropped from membership.

The fourth case was that of a girl in the seventh grade, who left because of economic pressure at home. The father was dead; there were eight children of whom she was the eldest; and the mother could not earn enough to keep the family fed and clothed. She was forced to leave school and go to work in order to increase the family income.

DISTRIBUTION OF REGULAR-SCHOOL SCORES

Table II gives the distribution of scores of the 14-to-16-year-olds in regular schools, together with the percentage of cases in each class interval. By comparing this with Table I it will be seen that the scores of both 14- and 15-year-olds in continuation school do not range as high as those in regular school, while for both ages the former go from 30 to 40 points lower. A graphical illustration of this relationship based upon the percentage¹ of cases in each class interval is shown in Figures 1 and 2. The former is for 14-year-olds and the latter for 15-year-olds. The continuous line, in each case, represents the continuation school; the broken line, the regular school. Median scores are shown by vertical basal bars. Two facts are brought out here very clearly: *First*, the median score of the continuation-school pupils in each case is much below that of pupils of the same age in the regular school; *second*, the 15-year-olds are only slightly better than the corresponding 14-year-olds. As the two diagrams are drawn to the same scale, this latter fact can be easily distinguished.

MEDIAN-SCORE DIFFERENCES

A more definite way of stating this median relationship is given in Table III. This shows that the 14-year-old group in

¹ In this and all other instances, graphical illustrations are based upon the percentage of cases in each class interval rather than the actual number. This is a fairer method of comparison when the numbers involved in both cases are small, or when those in one are much greater than in the other.

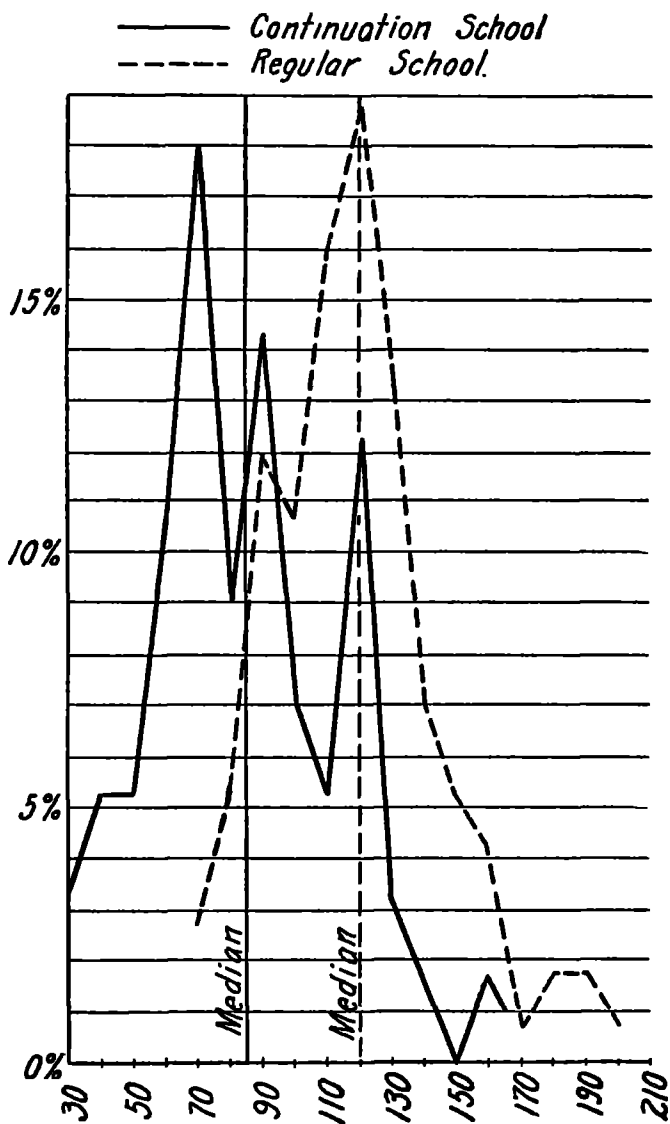


FIGURE 1

Distribution of scores of 14-year-olds on a percentage basis. Mediana are shown by lines perpendicular to the base.

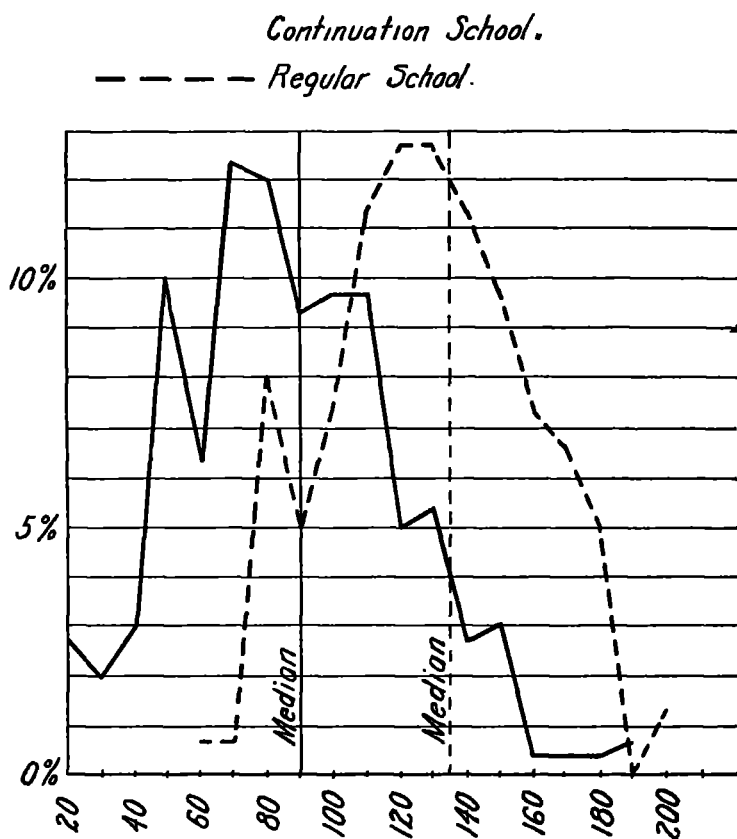


FIGURE 2

Distribution of scores of 15-year-olds on a percentage basis. Medians are shown by lines perpendicular to the base.

TABLE III

MEDIAN SCORES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	87.	121.90	34.90
15 years	89.23	134.41	45.18
Difference	2.23	12.51	10.28

school is 34.90 points above that in the continuation school, while in the case of 15-year-olds it is 45.18 points higher. The difference between 14- and 15-year-olds in continuation school is only 2.23 points, while between the same ages in regular school it is 12.51 points.

MEDIAN MENTAL-AGE DIFFERENCES

We can secure another viewpoint in regard to these median differences by stating them in terms of mental age. Based on the established standards for this series of tests, the mental ages, corresponding to the median scores given in Table III, are shown in Table IV. These figures show that the 14-year-

TABLE IV

MEDIAN MENTAL AGES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation		Median Regular School		Difference	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
14 years	12	2	14	8	2	6
15 years	12	4	15	6	3	2
Difference	2		10		8	

olds in regular school have a mental age 2 years and 6 months higher than pupils of the same age in continuation school, while the 15-year-olds in school have a positive margin of 3 years and 2 months. The differences between 14- and 15-year-olds in continuation and regular school are 2 months and 10 months, respectively.

MEDIAN INTELLIGENCE-QUOTIENT DIFFERENCES

The median chronological age for the 14-year group in continuation school was found to be 14-9, and that of the 14-year group in school, 14-6. Assuming that the median adult

mental age is 14-6 ¹ the I. Q.² of the median child, based upon the mental age in Table IV, is given in Table V.

If we accept an I. Q. of 100 as being normal, then the 14-year-old school group is just normal, while the 15-year-old group is slightly better; but in the continuation school the 14- and 15-year-old groups are 16 and 15 points below, re-

TABLE V

I. Q. OF THE MEDIAN CHILD IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	84	101	17
15 years	85	107	22
	—	—	—
Difference	1	6	5

spectively. If we compare the two 14- and 15-year groups the differences are still greater. In this instance the continuation school is 17 and 22 points below the corresponding age in regular school.

DIFFERENCES IN THE RANGE OF THE MIDDLE FIFTY
PER CENT OF THE CASES

Another good way of showing the relationship between the two groups is through the range of the middle 50 per cent of the cases. A diagram of this is given in Figure 3. Looking at the 14-year-old group, we notice that the upper pupil in the middle 50 per cent of the continuation school did not equal by 4.57 points the score of the lowest pupil in the middle 50 per cent of the school group. In the case of 15-year-olds the overlapping of score of the upper end of the middle 50 per cent of

¹ Dearborn, W. F., "Intelligence of Adults and Related Problems"; *Journal of Educational Research*, November, 1922.

² The Intelligence Quotient is found by dividing the mental age by the chronological age. As the actual median chronological age was beyond the assumed median adult mental age of 14 years and 6 months, the latter was taken as the denominator of the fraction.

the continuation school with the lower end of the regular school is 2 points. In other words 75 per cent of the continuation group is no better than the lowest 25 per cent of the school group.

Some writers compare the distribution of groups on the basis of the percentage of cases of one which overlap the

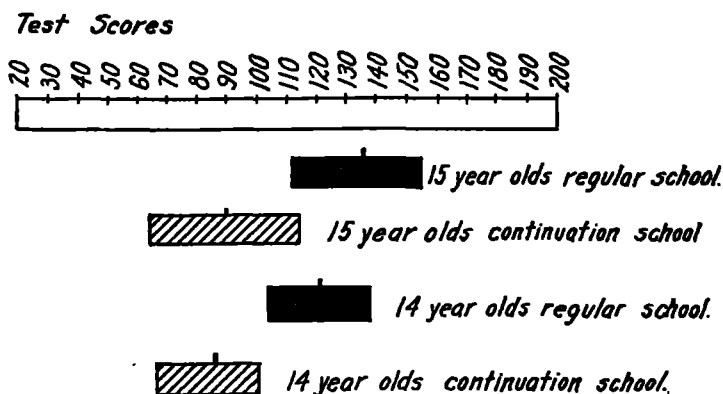


FIGURE 3

Scores made by the middle 50 per cent of 15- and 14-year-olds in regular and continuation school respectively. The vertical cross bar shows the median.

The scale at the top of the figure gives the test scores.

median of the other. Of course the maximum would be 50 per cent, when the two would coincide. In the case under discussion the number of 14-year-olds in continuation school which overlapped the median of the same age group in school was 17.3 per cent. In the case of the 15-year-olds it was 9.15 per cent. One can get a picture of this by looking back to Figures 1 and 2 and noting in each case the small area of the continuation distribution that lies above the median of the school group.

CONCLUSION

When we consider the evidence as presented by the four different methods: (1) the lower range of scores; (2) the lower

median scores, mental ages, and I. Q.'s; (3) the fact that the upper end of the middle 50 per cent of the continuation group just barely reaches the lower end of the middle 50 per cent of the school group; and (4) that only 17.3 per cent and 9.15 per cent, respectively for 14- and 15-year-olds, overlap the median of the school group — then it seems safe to conclude that low intelligence must be a factor of importance in accounting for the reason why pupils of these ages leave school to go to work.

CHAPTER III

THE RESULTS: CASE II

REASONS FOR THE SELECTION OF THIS CASE

CASE II represents all the continuation pupils in one of the larger cities of Massachusetts. This community was selected for study for three reasons: (1) the industries were very diversified; (2) the continuation-school group represented a heterogeneous racial ancestry, as many as twenty different types being distinguishable; (3) the underlying conditions were almost the opposite of those in Case I, and it was desired to see if the results would be similar. The total number of cases was 167, divided as follows: 14-year-olds, 29, and 15-year-olds, 138.

METHODS OF SELECTING THE REGULAR-SCHOOL GROUP

The number of pupils in regular school tested for comparative purposes was 276, of whom 135 were 14-year-olds and 141 were 15-year-olds. The method of selecting these was carefully safeguarded. The age-grade distribution for this city with ages as of April 1, 1922, showed the location of 14- and 15-year-old pupils in school as given in Table VI.

TABLE VI
AGE-GRADE DISTRIBUTION OF 14- AND 15-YEAR-OLD PUPILS IN
REGULAR SCHOOL

Ages	Grades						Total
	III	IV	V	VI	VII	VIII	
14 years	7	33	96	233	349	410	1128
15 years	1	7	37	126	209	365	745

Statistics were not available to show the enrollment in the grades beyond the 8th. It will be seen that the point of

greatest concentration of the 14-year-olds is in the 8th grade, and it would be expected that the same point for 15-year-olds would be in the first year of high school. This would be true with a six-year entering age and regular yearly progress. Of the total 276 cases, 111 were taken from the first and second years of high school and the remaining 165 were taken from grades six, seven, eight. This eliminates the exceptionally bright, who would be beyond the second year of high school, and also those retarded below grade six. The weight being given to those in elementary school, the results ought to be conservative, and the elimination of pupils at both ends of the distribution is not likely to affect greatly the central tendencies.

The method employed to secure an unselected group for the grades given above was then determined. The class lists were taken and the 14- and 15-year-olds were arranged in alphabetical order. The first name under each letter was selected. If twenty-six, the number of letters in the alphabet, were not taken from one group, then the following class would begin with the letter next to the one where the first left off. This was done in order not to omit unusual names at the lower end. After this was completed, the number picked out was examined again for nationality. Where one racial group was not represented, one or more pupils were added to take the place of those in the racial group which had the largest number. This method did two things: (1) it ensured an unselected group, in so far as this is possible; and (2) it gave a sampling of all the racial combinations which appeared in the continuation school.

DISTRIBUTION OF CONTINUATION- AND REGULAR-SCHOOL SCORES

This distribution of the scores of 14- and 15-year-olds in continuation school is given in Table VII. The number of

14-year-olds is much smaller than that of 15-year-olds for the same reasons given under Case I. A similar distribution for those in regular school is given in Table VIII. A comparison of the two tables mentioned above shows that the scores of both 14- and 15-year-olds in continuation school do not range as high as those in regular school, and on the other end they

TABLE VII
DISTRIBUTION OF SCORES OF PUPILS IN CONTINUATION SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
180-170 .....	..	...	1	.7
170-160 .....	..	...	1	.7
160-150 .....	..	...	8	5.6
150-140	5	17.5	10	7.
140-130 .....	..	...	12	8.4
130-120	1	3.5	16	11.2
120-110	4	14.	13	9.1
110-100	7	24.5	11	7.7
100-90	4	14.	19	13.3
90-80	3	10.5	14	9.8
80-70	1	3.5	11	7.7
70-60	3	10.5	10	7.
60-50 .....	..	...	8	5.6
50-40	1	3.5	3	2.1
40-30 .....	..	...	..	...
30-20 .....	..	...	1	.7
	—		—	
	29		138	

NOTE. This table reads as follows: 7 pupils out of 29, or 24.5 per cent, of 14-year-olds scored between 100 and 110; 8 out of 138, or 5.6 per cent, of 15-year-olds scored between 150 and 160.

are lower. This difference is perhaps best illustrated by Figures 4 and 5, based upon the percentage of cases in each class interval. The former is for 14-year-olds and the latter for 15-year-olds. The continuous line, in each case, represents the continuation school, and the broken line, the regular school. Median scores are shown by vertical basal bars. Besides the general character of the whole distribution, two other facts are clearly shown. These are: (1) the

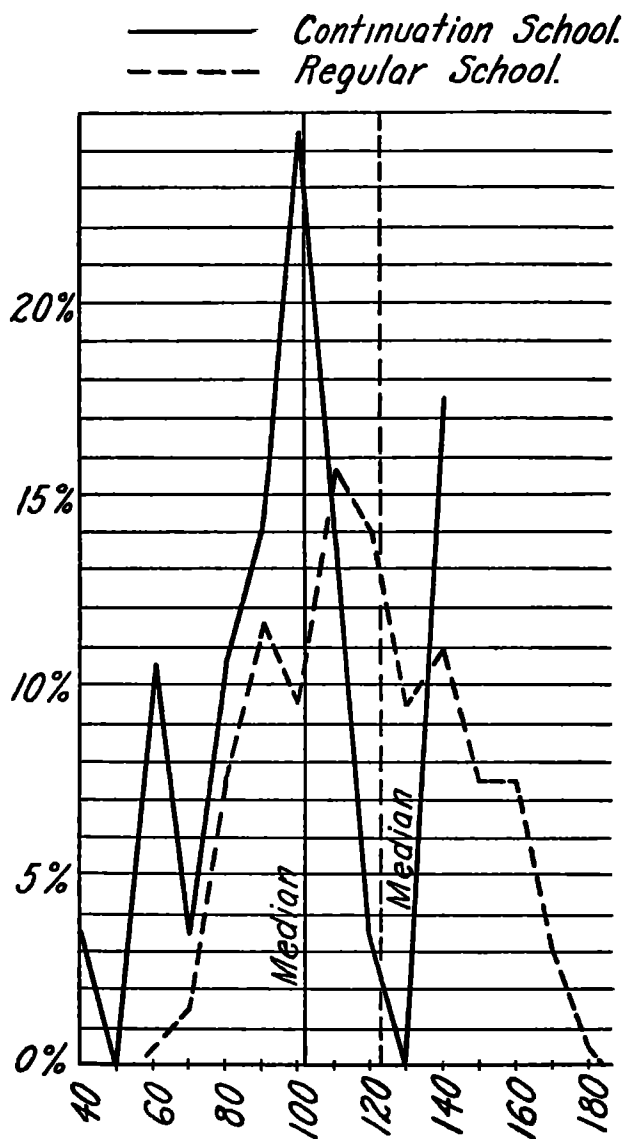


FIGURE 4

Distribution of scores of 14-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

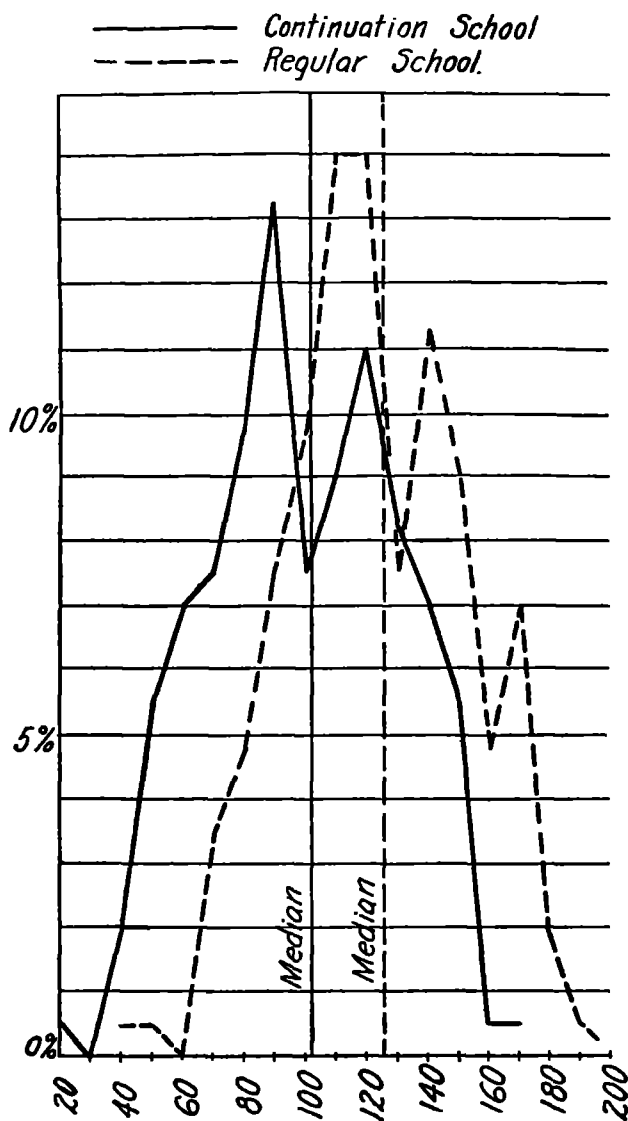


FIGURE 5

Distribution of scores of 15-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

median score of the continuation pupils in each case is much below that of pupils of the same age in regular schools; and (2) the 15-year-olds are only slightly better than the corresponding 14-year-olds. These facts are the same that were

TABLE VIII
DISTRIBUTION OF SCORES OF PUPILS IN REGULAR SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
200-190 .....	..	...	1	.7
190-180	1	.75	3	2.1
180-170	4	3.	10	7.
170-160	10	7.5	7	4.9
160-150	10	7.5	13	9.1
150-140	15	11.2	17	11.9
140-130	13	9.7	11	7.7
130-120	19	14.2	20	14.
120-110	21	15.7	20	14.
110-100	13	9.7	14	9.8
100-90	16	11.9	11	7.7
90-80	10	7.5	7	4.9
80-70	2	1.5	5	3.5
70-60	1	.75	..	...
60-50 .....	..	...	1	.7
50-40 .....	..	...	1	.7
	<hr/> 135		<hr/> 141	

NOTE. This table reads as follows: 10 pupils out of 135, or 7.5 per cent, of 14-year-olds scored between 150 and 160; 20 out of 141, or 14 per cent, of 15-year-olds scored between 120 and 130.

found under Case I, only to a less degree, as will be shown later.

MEDIAN-SCORE DIFFERENCES

The median relationship is given in Table IX. This shows that the 14-year-old group in school is 18.79 points above that of the corresponding continuation group, while in the case of 15-year-olds it is 23.03 points higher. The difference between 14- and 15-year-olds in continuation school is less

TABLE IX

MEDIAN SCORES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	103.57	122.36	18.79
15 years	102.72	125.95	23.03
Difference .....	.85 *	3.59	4.24

* In favor of 14-year-olds.

than one point, while that between the same ages in regular school is 3.59 points.

MEDIAN MENTAL-AGE DIFFERENCES

If we now state these median differences in terms of mental ages, based upon the established standard for this series of tests, we shall have the results given in Table X. These show

TABLE X

MEDIAN MENTAL AGES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation Yrs. Mos.	Median Regular School Yrs. Mos.	Difference Yrs. Mos.
14 years	13 3	14 8	1 5
15 years	13 2	14 11	1 9
Difference	1 *	3	4

* In favor of 14-year-olds.

that the mental age of the 14-year-olds in regular school is one year and five months higher than that of the same age in continuation school, while the 15-year school group exceeds the other by one year and nine months. The 14- and 15-year-olds in continuation school have nearly the same mental age, while in the regular school there is a difference of 3 months.

MEDIAN INTELLIGENCE-QUOTIENT DIFFERENCES

In Table XI is given the I. Q. of the median child based upon the mental-age data of Table X. It so happens that for both the 14- and 15-year-old groups in the continuation school

TABLE XI

I. Q. OF THE MEDIAN CHILD IN CONTINUATION AND REGULAR SCHOOLS

Age	Continuation	Regular School	Difference
14 years	93	101	8
15 years	93	103	10
	—	—	—
Difference	0	2	2

this is 93, while for the corresponding regular-school groups it is 101 and 103 respectively. Assuming an I. Q. of 100 as being normal, this means that the median child in continuation school is approximately 10 points below normal, while the one in the regular-school group is a little above normal. If we compare the two 14- and 15-year-old groups, the differences are 8 and 10 points respectively.

DIFFERENCES IN THE RANGE OF THE MIDDLE FIFTY PER CENT OF THE CASES

Figure 6 shows the scores made by the middle 50 per cent of those in continuation school in comparison with those of

Test Scores

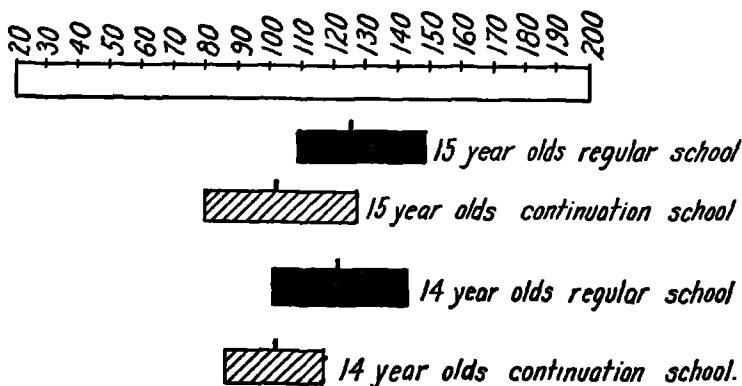


FIGURE 6

Scores made by the middle 50 per cent of 15- and 14-year-olds in regular and continuation schools respectively. The vertical cross bar shows the median.
The scale at the top of the figure gives the test scores.

the same age in school. It can be readily seen that the 75 percentile of the 15-year-old continuation group just passes the median of the school group, while in the case of 14-year-olds this point is slightly more than 10 points below the corresponding school median. The percentages of cases in the continuation-school distribution overlapping the median of the corresponding school groups are 19.6 per cent for 14-year-olds and 28.3 per cent for 15-year-olds. This is shown graphically in Figures 4 and 5.

CONCLUSION

The facts in the case just discussed show the same results as those presented in Case I, only to a less degree. The median scores, mental ages, and I. Q.'s of the two groups are nearer together. The middle 50 per cent of the continuation group overlapped considerably the middle 50 per cent of the regular-school group, whereas in the former case they barely touched. The percentage of continuation-school cases scoring above the median of the school group is higher, there being an increase of 2.6 per cent and 19 per cent for 14- and 15-year-olds respectively. There is difference enough, however, so that it seems safe to conclude that low intelligence is an important factor in selecting those pupils of these ages who leave school to go to work. The smaller degree of variation will be discussed in a subsequent chapter.

CHAPTER IV

THE RESULTS: CASE III

REASONS FOR THE SELECTION OF THIS CASE

THE large cotton mills of Massachusetts are heavy employers of 14-to-16-year-old labor. As children in this industry had not been tested, it was thought advisable to carry this investigation into a typical mill-center. Two plans of procedure presented themselves. The first was to select one of the largest cities with a continuation-school enrollment of nearly 2500 pupils. This would have meant the sampling of both the continuation and regular schools. The second was to take a smaller city, with a moderate enrollment, and test every 14- and 15-year-old pupil in the entire public-school system. The latter method was finally decided upon as being the most reliable, and the results are herewith presented as Case III. The total number of continuation pupils is 320 — 14-year-olds, 112, and 15-year-olds, 208. The number in regular schools tested included *all* 14- and 15-year-old pupils, from the last year in high school down through and including those in special classes for deficient children. The whole number was, of 14-year-olds, 342, and of 15-year-olds, 249.

DISTRIBUTION OF CONTINUATION- AND REGULAR-SCHOOL SCORES

The distribution of scores of the continuation group, together with the percentage of cases in each class interval, is given in Table XII. As in the two preceding cases, we see that the number of 14-year-olds is less than that of 15-year-olds. The reasons for this were pointed out under Case I. Table XIII gives the same information for the regular-school group.

A comparison of these two will show one striking characteristic which did not appear in similar tables under preceding cases. In the former the scores of continuation pupils ranged up to 40 points lower than the corresponding school groups, while in this instance the variation is less than 10 points. This

TABLE XII
DISTRIBUTION OF SCORES OF PUPILS IN CONTINUATION SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
170-160 .....	..	...	3	1.5
160-150 .....	..	..	2	1.
150-140	1	.9	8	4.
140-130	3	2.7	7	3.5
130-120	2	1.8	6	3.
120-110	8	7.2	18	9.
110-100	9	8.1	29	14.5
100-90	15	13.5	27	13.5
90-80	22	19.8	25	12.5
80-70	21	18.0	35	17.5
70-60	9	8.1	12	6.
60-50	9	8.1	18	9.
50-40	5	4.5	10	5.
40-30	7	6.3	7	3.5
30-20 .....	..	...	..	...
20-10	1	.9	1	.5
	112		208	

NOTE. This table reads as follows: 3 pupils out of 112, or 2.7 per cent, of 14-year-olds scored between 130 and 140; 8 out of 208, or 4 per cent, of 15-year-olds scored between 140 and 150.

is accounted for, as stated above, because every pupil between 14 and 16 years of age in regular school was tested, the deficient cases not being excepted.

While not bearing directly on this thesis, these data show very clearly the extent of elimination from school at these ages. The total number of pupils 14 years of age, including the continuation- and regular-school groups, is 454; the total number of 15-year-olds in the combined groups is 457 — a very close agreement. The number of 14-year-olds at work

is 112, which means a 22.5 per cent elimination. In the case of 15-year-olds, the number at work is 208, or 45.6 per cent — a figure just double that for the earlier age.

Figures 7 and 8 give a graphical distribution of the data in Tables XII and XIII on a percentage basis. The former is

TABLE XIII

DISTRIBUTION OF SCORES OF PUPILS IN REGULAR SCHOOL

Score	<i>14-Year-Olds</i>		<i>15-Year-Olds</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
200-190 .....	..	...	1	.4
190-180	6	1.8	5	2.
180-170	8	2.4	10	4.
170-160	21	6.3	13	5.2
160-150	30	9.	33	13.2
150-140	42	12.6	36	14.4
140-130	38	11.4	37	14.8
130-120	35	10.5	26	10.4
120-110	36	10.8	26	10.4
110-100	33	9.9	19	7.6
100-90	24	7.2	18	7.2
90-80	15	4.5	11	4.4
80-70	21	6.3	3	1.2
70-60	15	4.5	5	2.
60-50	10	3.	3	1.2
50-40	5	1.5	1	.4
40-30	2	.6	1	.4
30-20	1	.3	1	.4
	342		249	

NOTE. This table reads as follows: 21 out of 342, or 6.3 per cent, of 14-year-olds scored between 160 and 170; 10 out of 249, or 4 per cent, of 15-year-olds scored between 170 and 180.

for 14-year-olds and the latter for 15-year-olds. The continuous line, in each case, represents the continuation school; the broken line, the regular school. Median scores are shown by vertical basal bars. Besides the general character of the whole distributions, these show clearly two things. *First*, the median score of the continuation-school pupils, in each case, is much below that of pupils of the same age in regular school;

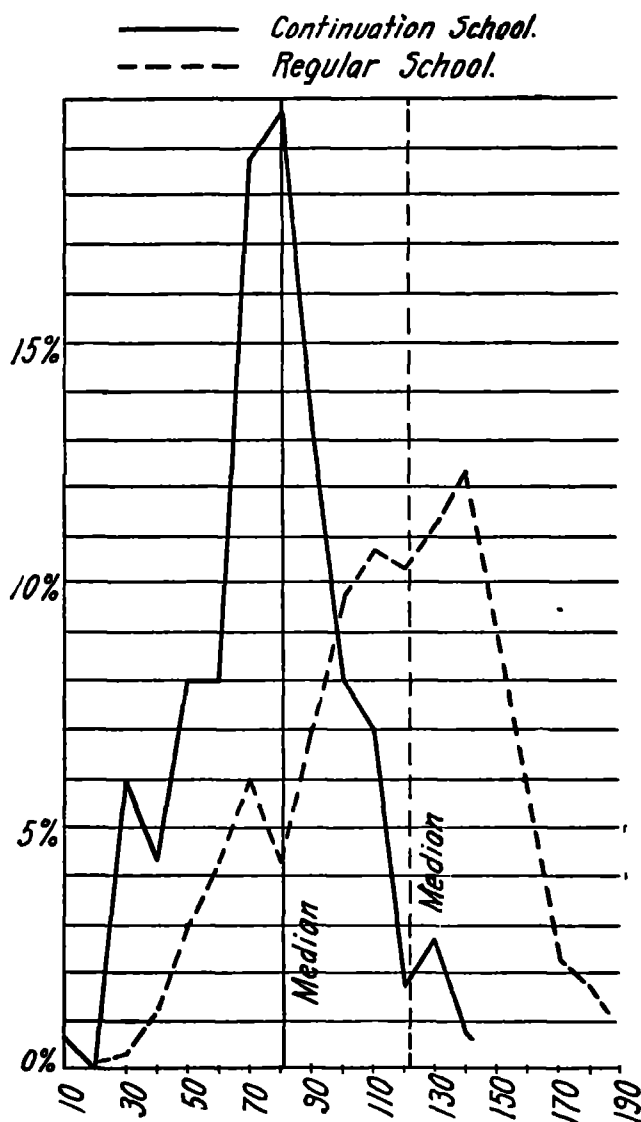


FIGURE 7

Distribution of scores of 14-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

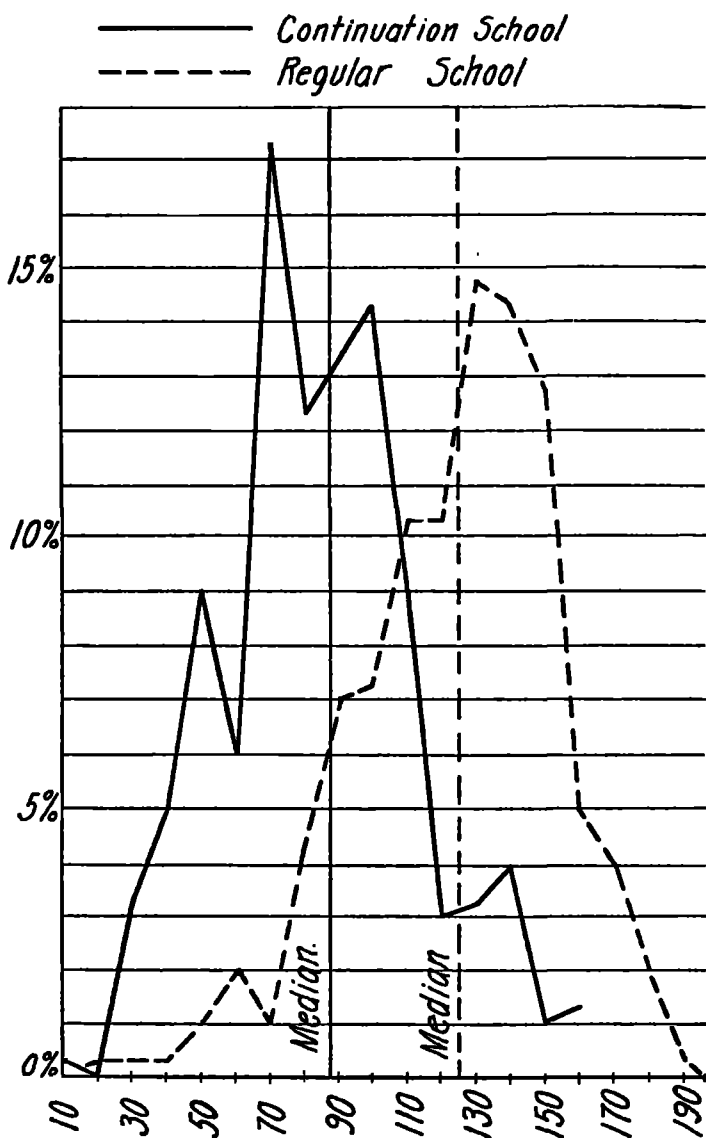


FIGURE 8

Distribution of scores of 15-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

second, the 15-year-olds are only slightly better than the corresponding 14-year-olds.

MEDIAN-SCORE DIFFERENCES

A more definite way of stating the median relationship is given in Table XIV. This shows that the 14-year-old group

TABLE XIV

MEDIAN SCORES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	81.81	122.57	40.76
15 years	88.4	132.83	44.43
Difference	6.59	10.26	3.67

in regular school is 40.76 points above that in the continuation school, while the 15-year-old group is 44.43 points higher. These differences are the largest of all the cases studied. The differences in median scores between the 14- and 15-year-olds in continuation and regular schools are 6.59 and 10.26 points respectively. These are also the largest discovered.

MEDIAN MENTAL-AGE DIFFERENCES

Considering the high median-score differences, one would naturally expect an equally great separation in the mental ages and I. Q.'s. This is exactly the case. Table XV shows

TABLE XV

MEDIAN MENTAL AGES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation Yrs. Mos.	Median Regular School Yrs. Mos.	Difference Yrs. Mos.
14 years	11 11	14 8	2 9
15 years	12 4	15 5	3 1
Difference	5	9	4

a mental-age difference between the 14-year-olds of 2 years and 9 months, while for 15-year-olds it is 3 years and 1 month. The differences between 14- and 15-year-olds in continuation and regular schools are 5 and 9 months respectively.

MEDIAN INTELLIGENCE-QUOTIENT DIFFERENCES

The I. Q.'s of the median child, as presented in Table XVI, are 82 and 85 respectively for 14- and 15-year-olds in the continuation school, compared with 101 and 106 for the regular school.

TABLE XVI

I. Q. OF THE MEDIAN CHILD IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	82	101	19
15 years	85	106	21
	—	—	—
Difference	3	5	2

Assuming 100 as normal, this means that the median child in the continuation school is considerably below normal, while the one in the school group is a little above normal. If we compare the two 14- and 15-year groups, the differences are 19 and 21 points respectively.

DIFFERENCES IN THE RANGE OF THE MIDDLE FIFTY PER CENT OF THE CASES

Figure 9 shows the range in score of the middle 50 per cent of those in continuation school in comparison with those of the same age in regular school. This clearly shows that in both the 14- and 15-year-olds the 75 percentile of the continuation group does not reach the 25 percentile of the regular school.

The differences are 9.15 and 2.85 points for 15- and 14-year-old groups. In other words 79.83 per cent of the 15-

year-olds in continuation school are no better than the lowest 25 per cent of the corresponding school group, while for 14-year-olds the figure is 89.7 per cent. The percentages of con-

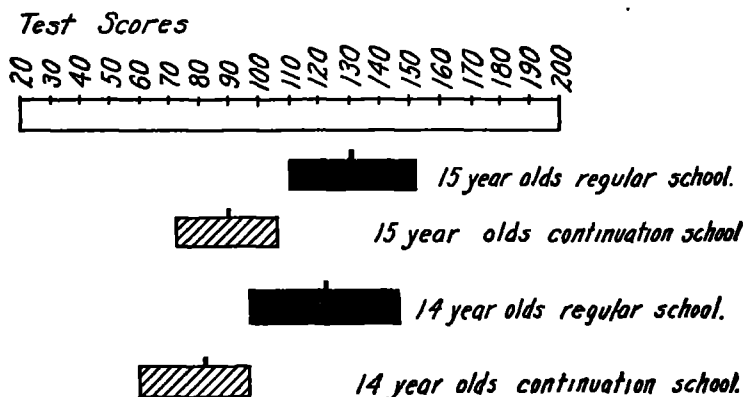


FIGURE 9

Scores made by the middle 50 per cent of 15- and 14-year olds in regular and continuation schools respectively. The vertical cross bar shows the median. The scale at the top of the figure gives the test scores.

tinuation cases overlapping the median of the regular-school group are 3.92 and 7.93 per cent for 14- and 15-year-olds respectively.

CONCLUSION

The facts presented in this case are as follows: (1) the continuation-school groups have lower median scores, mental ages, and I. Q.'s; (2) their 75 percentiles do not reach the 25 percentiles of the regular-school groups; and (3) only 3.92 and 7.93 per cent of 14- and 15-year-olds overlap the median of the regular-school group. On every point the differences between the two groups are the greatest of all the cases studied. It seems safe to conclude, therefore, that low-grade intelligence is an important factor in accounting for the reason why pupils of these ages leave school to go to work.

CHAPTER V

THE RESULTS: CASE IV

REASONS FOR THE SELECTION OF THIS CASE

THE Massachusetts law relative to continuation education provides that the worker must attend school in the town where he is employed, regardless of where he may live. All the cases so far studied were little affected by this provision, as almost all the boys and girls were employed in their home communities. It was thought advisable to test some city in the metropolitan area, where the continuation school would be composed, to some extent, of residents of surrounding communities employed in that city. This fourth and last case represents the results found in a city involving such conditions.

METHODS OF SELECTING THE REGULAR-SCHOOL GROUP

All the pupils in the continuation school, a total of 444, were tested. These included 110 of 14-year-olds and 334 of 15-year-olds. To secure comparative standards, the examination was given to all of the 14-to-16-year-old pupils in the first two years of high school. These numbered 878, with 428 of 14- and 450 of 15-year-olds. The reasons for this sampling were: (1) an age-grade table showing the distribution of pupils throughout the school system was not available; (2) with an entering age of six to seven years and normal progress, the average 14-year-old child, at the time the tests were given, would be in the first year of high school and the average 15-year-old in the second year; (3) in this particular community the children of a certain class are not sent to the public high school, but are educated in private preparatory

schools. After a careful consideration of objective data, it seemed fair to assume that these privately educated children were of better than the normal intelligence. As it was impossible to examine this brighter group, it was thought unfair to include a sampling of the slower pupils found below high school. With both ends of the distribution eliminated,

TABLE XVII

DISTRIBUTION OF SCORES OF PUPILS IN CONTINUATION SCHOOL

Score	<i>14-Year-Olds</i>		<i>15-Year-Olds</i>	
	No. of Cases	Percent of Cases	No. of Cases	Percentage of Cases
170-160	1	.9	3	.9
160-150	1	.9	8	2.4
150-140	5	4.5	20	6.
140-130	8	7.2	18	5.4
130-120	7	6.3	28	8.4
120-110	11	9.9	32	9.6
110-100	22	19.8	36	10.8
100-90	11	9.9	35	10.5
90-80	12	10.8	43	12.9
80-70	8	7.2	35	10.5
70-60	9	8.1	17	5.1
60-50	7	6.3	21	6.3
50-40	2	1.8	14	4.2
40-30	6	5.4	18	5.4
30-20 .....	..	...	4	1.2
20-10 .....	..	...	2	.6
	110		334	

NOTE. This table reads as follows: 22 pupils out of 110, or 19.8 per cent, of 14-year-olds scored between 100 and 110; 20 out of 334 or 6 per cent, of 15-year-olds, scored between 140 and 150.

the central tendency is not likely to be affected. That this reasoning was not far from the facts is shown by the median score. For 14-year-olds this is slightly above that of our other regular-school groups, while for 15-year-olds it is somewhat below. Further explanation of these differences will be given later.

DISTRIBUTION OF CONTINUATION- AND REGULAR-SCHOOL SCORES

The general character of the results is indicated in Tables XVII and XVIII. The former gives the distribution of scores of those in continuation school, together with the percentage of cases in each class interval, and the latter gives

TABLE XVIII
DISTRIBUTION OF SCORES OF PUPILS IN REGULAR SCHOOL

Score	<i>14-Year-Olds</i>		<i>15-Year-Olds</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
190-180	1	.25	1	.23
180-170	8	2.	4	.92
170-160	24	6.	20	4.6
160-150	39	9.7	41	9.4
150-140	60	15.	75	17.2
140-130	65	16.2	67	15.4
130-120	66	16.5	48	11.
120-110	43	10.7	65	16.7
110-100	45	11.2	43	9.8
100-90	32	8.	37	8.5
90-80	28	7.	33	7.5
80-70	6	1.5	7	1.6
70-60	6	1.5	3	.69
60-50	2	.5	2	.46
50-40	3	.75	1	.23
40-30 .....	..	...	3	.69
	428		450	

NOTE: This table reads as follows: 24 pupils out of 428, or 6 per cent, of 14-year-olds scored between 160 and 170; 75 out of 450, or 17.2 per cent, of 15-year-olds scored between 140 and 150.

the same information for the regular-school group. A comparison of these two shows that in the case of 14-year-olds the continuation scores are lower by twenty points at the top and ten at the bottom. For 15-year-olds the continuation variation is just twenty points less on either end. As has been noted before, in all the other cases, the number of 14-year-olds employed is less than that of 15-year-olds, for reasons which are stated under Case I.

A graphical presentation of the data of Tables XVII and XVIII on a percentage basis is given in Figures 10 and 11. The former is for 14-year-olds, and the latter for 15-year-olds. The continuous line, in each case, represents the continuation school; the broken line, the regular school. Median scores are shown by vertical basal bars. The reader will easily note the general superiority of the school group and the wide difference between the median scores.

MEDIAN-SCORE DIFFERENCES

While Figures 10 and 11 give a picture of the general relationship between the two groups, the exact median differences are given in Table XIX. There are two points concern-

TABLE XIX

MEDIAN SCORES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation	Median Regular School	Difference
14 years	99.9	127.42	27.52
15 years	93.7	126.45	32.75
Difference	6.2	.97	5.23

ing this which will be noted. *First*, the median score of the 15-year-old continuation pupils is below that of the 14-year-olds. This is the only case where such a condition occurs and is accounted for by two reasons: (1) the difference in the number of cases, there being three times as many in the 15-year-old distribution; and (2), with few jobs, many applicants, and open competition between local and non-resident candidates, the employer naturally picks the most "likely looking" of the group. This was checked by the data, which showed that one of every three pupils 14 years of age was a non-resident, all except one of whom scored above the median of the group. *Second*, the median for 14-year-olds in regular school is approximately four points above the average of the

CONTINUATION-SCHOOL CHILDREN

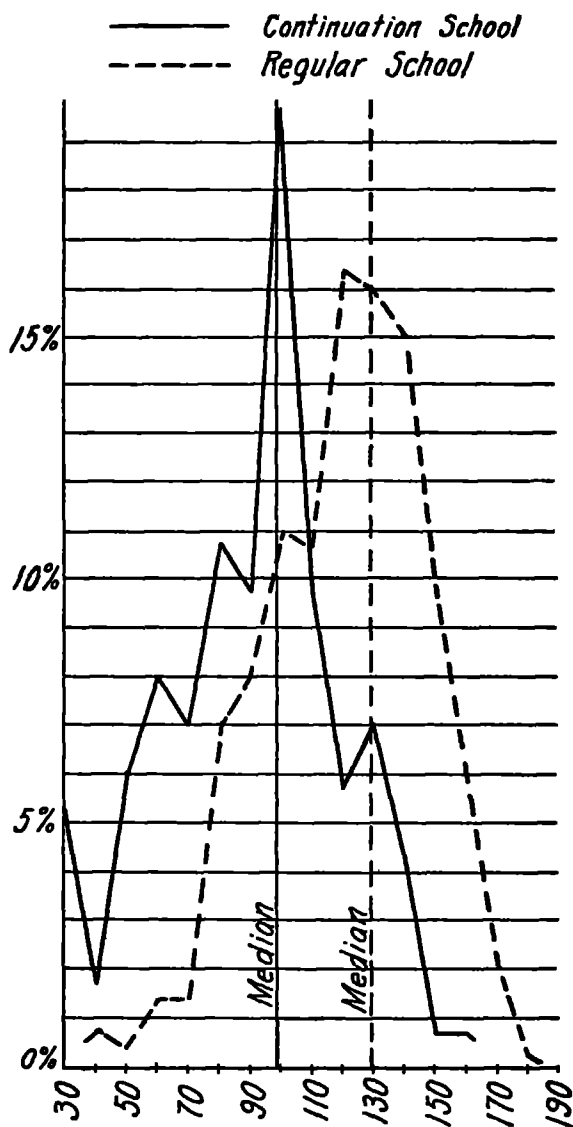


FIGURE 10

Distribution of scores of 14-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

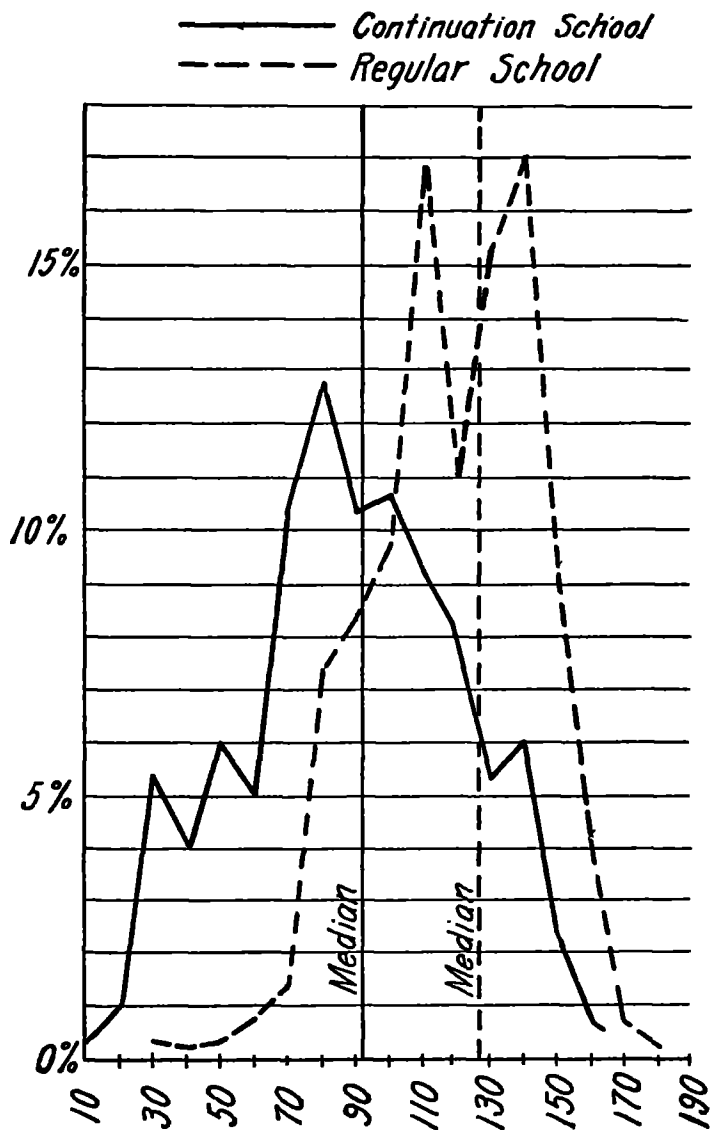


FIGURE 11

Distribution of scores of 15-year-olds on a percentage basis.
Medians are shown by lines perpendicular to the base.

four cases, while that of the 15-year-olds is seven points below. This shows, as was stated at the beginning of this chapter, that the sampling was not far from the average of the school group. *Third*, the 14-year-old group in school is 27.52 points above that in the continuation school, while the 15-year-olds are 32.75 points higher. *Fourth*, there is very little difference between 14- and 15-year-olds in both continuation and regular schools, the amounts being 6.2 points for the former and less than one point for the latter.

MENTAL-AGE DIFFERENCES

If we state these median differences in terms of mental ages, as in the preceding cases, we shall have the results given

TABLE XX

MEDIAN MENTAL AGES OF PUPILS IN CONTINUATION AND REGULAR SCHOOLS

Age	Median Continuation		Median Regular School		Difference	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
14 years	13	..	15	..	2	..
15 years	12	8	14	11	2	3
Difference	4		1		3	

in Table XX. These figures show that the regular-school pupils exceed those in continuation school by 2 years for 14-year-olds and 2 years and 3 months for 15-year-olds. The differences between 14- and 15-year-olds in continuation and regular school are 4 months and 1 month, respectively.

MEDIAN INTELLIGENCE-QUOTIENT DIFFERENCES

Table XXI gives the I. Q. of the median child, based upon the mental-age data of the preceding table. This shows the regular-school group to be normal or slightly better; but in the continuation school the 14- and 15-year-olds are 10 and 13 points below, respectively. If we compare the continuation with the school group we find the former 14 and 16 points be-

TABLE XXI

I. Q. OF THE MEDIAN CHILD IN CONTINUATION AND REGULAR SCHOOL

Age	Median Continuation	Median Regular School	Difference
14 years	90	104	14
15 years	87	103	16
	—	—	—
Difference	3	1	2

hind for 14- and 15-year-olds. Again the difference between the 14- and 15-year-groups is seen to be small, only 3 points in the continuation and 1 in the regular school.

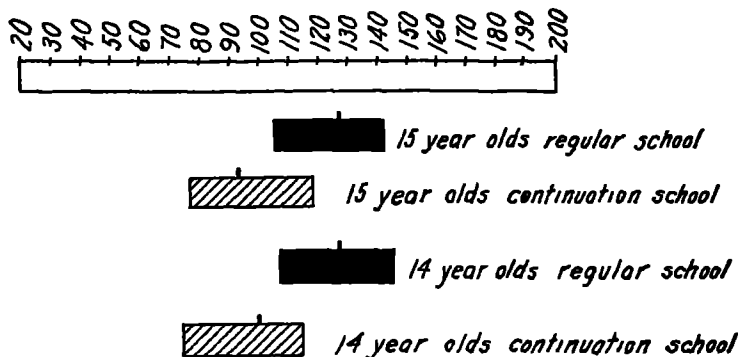
Test Scores

FIGURE 12

Scores made by the middle 50 per cent of 15- and 14-year-olds in regular and continuation schools respectively. The vertical cross bar shows the median.

The scale at the top of the figure gives the test scores.

DIFFERENCES IN THE RANGE OF THE MIDDLE FIFTY PER CENT OF THE CASES

Figure 12 shows the range in score of the middle 50 per cent of those in continuation school in comparison with those of the same age in regular school. This brings out the fact that the middle 50 per cent of 15-year-olds in continuation school overlaps the middle 50 per cent of the regular-school group by 11 points, while for 14-year-olds this overlapping

is 9 points. The percentages of continuation pupils scoring above the median of the regular-school group are 16.09 per cent for 14-year-olds and 17.61 per cent for 15-year-olds.

CONCLUSION

The evidence presented here does not differ from that found in all the other cases except in minor details. On the part of continuation-school pupils there is (1) a lower range of scores; (2) a lower median score, mental age, and I. Q.; (3) an overlapping of only 9 and 11 points in the middle 50 per cent of the 14- and 15-year-olds between the corresponding school groups; (4) only 16 and 17 per cent of 14- and 15-year-olds who scored above the median of the regular pupils. All of these methods show a striking difference in intelligence, which must be considered in determining why pupils of these ages leave school to go to work.

CHAPTER VI

A COMPARATIVE AND TOTAL ANALYSIS

RACIAL AND INDUSTRIAL SIGNIFICANCE

THE data in each individual case have been presented and analyzed. It is the purpose of this chapter to point out some significant comparisons which have not yet been discussed. The underlying factors in each instance will be briefly summarized as follows: (1) Case I, a homogeneous racial group, two industries, and all the 14-to-16-year-olds in regular school examined; (2) Case II, a heterogeneous racial group and diversified industries, with standards from an unselected group ranging from grade 6 through the second year of high school; (3) Case III, a single racial group and a single industry with all the 14-and-16-year-olds in regular school tested; (4) Case IV, a cosmopolitan group, variety of industries, comparative group including all 14-to-16-year-olds in the first two years of high school.

Table XXII gives a comparison of the median scores of the continuation-school groups. If we will rank the cases in order of the highest scores we will have: (1) Case II, a heterogeneous racial group and diversified industries; (2) Case IV, also a cosmopolitan group and a variety of industries; (3) Case I, a homogeneous racial group and few industries; (4) Case III,

TABLE XXII

COMPARATIVE MEDIAN SCORES OF CONTINUATION-SCHOOL GROUPS

Age	Case I	Case II	Case III	Case IV
14 years	87.	103.57	81.81	99.9
15 years	89.23	102.72	88.4	93.7
Difference	2.23	.85*	6.59	6.2

* In favor of 14-year-olds.

practically one nationality and one industry. Bearing in mind always the limits of this investigation, *i.e.*, that it confines itself to 14- and 15-year-old pupils in continuation school, it seems safe to conclude: (1) there is a relationship between racial groups and intelligence; and (2) different industries demand and employ persons with different mental abilities. We should note at once, however, that the racial groups in this country may not be typical of the same races in the countries in which they are indigenous. The problem of selection will not be discussed. The comparison is simply of the racial groups as found. Differences in language, racial experiences, and interests may also affect the results.

Furthermore, whether the low score in Case III is due to a single race or this particular one, or whether it is caused by the demands of a single industry or this particular industry, the writer does not attempt to state. Neither does he explain whether the cause of the high scores in Case II is a diversified racial group or the combination that happened to be there, or, from the industrial side, whether it was due to the large number represented or the particular selection. It is not within the scope of the investigation to carry this point further. The writer wishes, however, to indicate the probability that with sufficient evidence one could rate the intelligence of the different racial groups now in this country. It would be possible, also, to determine the median mental age required of 14-to-16-year-old persons by different industries. Such information in the hands of placement officers would be of valuable service in locating boys and girls in positions where there was greater possibility of success than under present conditions. It is possible, also, that the results of psychological job analyses combined with individual intelligence test ratings might be applied to all occupations, thereby eliminating much maladjustment and contributing greatly to social and economic progress.

REASONS FOR SMALL MEDIAN-SCORE DIFFERENCES BETWEEN 14- AND 15-YEAR-OLDS IN CONTINUATION SCHOOL

It has been pointed out in previous chapters that the difference in median scores between the 14- and 15-year-olds is very small. This can be easily seen in Table XXII, the range being from .85 of a point to 6.59 points. There are a number of factors which may be the cause of this. *First*, it may be due to the fact that they have reached the limit of growth, as adult intelligence is supposed to be attained somewhere within these

TABLE XXIII

COMPARATIVE MEDIAN SCORES OF REGULAR-SCHOOL GROUPS

Age	Case I	Case II	Case III	Case IV
14 years	121.90	122.36	122.57	127.42
15 years	134.41	125.95	132.83	126.45
Difference	12.51	3.59	10.26	.97

ages. This difference would then indicate the variability of adult intelligence rather than amount of growth from one year to another. *Second*, it may be due to the fact that retarded persons develop at a slower rate than do normal ones. If we assume that a normal pupil advances one unit per year, then three quarters, one half, or one third may be the rate for the slower one. Whatever the cause, the small amount of median difference would seem to indicate that, for purposes of grading in the continuation school, chronological age was not a factor to be considered.

RELIABILITY OF MEDIAN SCORES OF REGULAR-SCHOOL GROUPS

In Table XXIII is given a comparison of the median scores of the regular-school groups. Here it will be noticed that in Cases I and III where all of the 14- and 15-year-olds in regular school in the entire public school system were tested,

the median scores for 14-year-olds varied only .67 of a point and for 15-year-olds only 1.58 points.¹ As has been pointed out above, the median for 15-year-olds in both Cases II and IV is probably low, while that of 14-year-olds in Case IV is slightly high, although the differences are so small as to be of slight significance in affecting the results of this investigation.

REASONS FOR LARGE MEDIAN-SCORE DIFFERENCES BETWEEN 14- AND 15-YEAR-OLDS IN REGULAR SCHOOL

It has been pointed out in the case of the continuation-school groups that the median scores of 14- and 15-year-olds are very close together. This is by no means true for the 14- and 15-year-olds in regular school as can be seen by the scores in Cases I and III where all pupils of these ages in school were tested. Here the differences are 12.51 and 10.26 points respectively. With the number of 14- and 15-year-olds in the community in each case very nearly equal, and assuming that adult intelligence is reached sometime during these ages, a small median difference would naturally be expected. A reasonable method of accounting for this large difference in comparison with the continuation school is (1) those who leave school are of low grade mental ability and (2) about twice as many 15-year-olds as 14-year-olds are at work. The former would make both school groups highly selected and the 15-year-olds more chosen than the 14-year-olds. This is exactly the condition that was pointed out in a discussion of the facts of Case III. Had all of the 14-to-16-year-old-pupils in the regular-school system of Cases II and IV been tested, a similar result probably would have been discovered.²

¹ These median scores vary less than two points from the published standards for this test for these ages. In view of this agreement the reliability of the median scores, mental ages, and I. Q.'s found in this investigation must be considered high.

² Very strong evidence supporting this hypothesis has been obtained by the Psycho-Educational Clinic of Harvard University where whole school systems have been tested.

COMPARATIVE MEDIAN-SCORE DIFFERENCES

A comparative arrangement of the differences in median score between the continuation- and regular-school groups is given in Table XXIV. This shows that the range for 14-year-olds is from 18.79 up to 40.76 points while for 15-year-olds it is from 23.03 up to 45.18 points. Assuming that the median scores for the school groups were the same, and there was slight variation, as has been pointed out above, we should expect that by rating the cases in the order of the smallest dif-

TABLE XXIV

MEDIAN-SCORE DIFFERENCES BETWEEN THE CONTINUATION- AND
REGULAR-SCHOOL PUPILS

Age	Case I	Case II	Case III	Case IV
14 years	34.90	18.79	40.76	27.52
15 years	45.18	23.03	44.43	32.75
Difference	10.28	4.24	3.67	5.23

ference we should have a result exactly the reverse of that found when they were arranged according to the highest median scores. This is what does happen, the order here being (1) Case II, a heterogeneous racial group and diversified industries; (2) Case IV, a cosmopolitan group and variety of industries; (3) Case I, a homogeneous racial group and few industries; (4) Case III, one race and a single industry. This in itself is an argument for the mental inferiority of the continuation-school group for, had other factors been involved to any extent, the regular-school medians would have been equally affected and consequently would not have remained constant. The order of the differences then would not have been reversed.

COMPARATIVE MEDIAN MENTAL-AGE DIFFERENCES

Table XXV gives a comparison of the median mental ages for the different cases in the continuation and regular school,

and the differences between the two. The range in the continuation school for 14-year-olds is from 11 years and 11 months for Case III up to 13 years and 3 months for Case II; for 15-year-olds it is less; from 12 years and 4 months to 13 years and 2 months. In the regular school the 14-year-olds were very constant. In three cases the mental age was 14 years and

TABLE XXV

MEDIAN MENTAL AGES, CONTINUATION SCHOOL, REGULAR SCHOOL,
AND DIFFERENCES

Age	Case I		Case II		Case III		Case IV	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
<i>Continuation School</i>								
14 years	12	2	13	3	11	11	13	..
15 years	12	4	13	2	12	4	12	8
	<hr/>		<hr/>		<hr/>		<hr/>	
Difference	2		1*		5		.. 4*	
<i>Regular School</i>								
14 years	14	8	14	8	14	8	15	..
15 years	15	6	14	11	15	5	14	11
	<hr/>		<hr/>		<hr/>		<hr/>	
Difference	10		3		9		1	
<i>Differences between Continuation and Regular Schools</i>								
14 years	2	6	1	5	2	9	2	..
15 years	3	2	1	9	3	1	2	3

* In favor of 14-year-olds.

8 months and, in the other, 15 years. The 15-year-olds ranged from 14 years and 11 months up to 15 years and 6 months. The differences between the continuation- and regular-school pupils for 14-year-olds were from 1 year and 5 months in Case II to 2 years and 9 months in Case III. The 15-year-olds showed wider differences: from 1 year and 9 months in Case II to 3 years and 2 months in Case I.

COMPARATIVE INTELLIGENCE-QUOTIENT DIFFERENCES

The I. Q. of the median child in both continuation and regular schools together with the differences between the two

for each of the four cases studied is given in Table XXVI. In continuation school for 14-year-olds the range is from 82 in Case III to 91 in Case II; for 15-year-olds from 85 in Cases I and III to 90 in Case II. In regular school the median I. Q. for 14-year-olds is very constant, being 101 for three out of the four cases, the other being 104; for 15-year-olds two have

TABLE XXVI

I. Q. OF MEDIAN CHILD, CONTINUATION SCHOOL, REGULAR SCHOOL,
AND DIFFERENCES

Age	Case I	Case II	Case III	Case IV
<i>Continuation School</i>				
14 years	84	91	82	90
15 years	85	90	85	87
	—	—	—	—
Difference	1	1	3	3
<i>Regular School</i>				
14 years	101	101	101	104
15 years	107	103	106	103
	—	—	—	—
Difference	6	2	5	1
<i>Differences between Continuation and Regular Schools</i>				
14 years	17	10	19	14
15 years	22	13	21	16

103 and the others 106 and 107. The differences between the two groups for 14-year-olds are from 10 points in Case II to 19 in Case III; for 15-year-olds, from 13 points in Case II to 22 in Case I.

COMPARATIVE ANALYSIS OF SCORES OF THE TOTAL CONTINUATION-SCHOOL AND TOTAL REGULAR-SCHOOL GROUPS

The variation in median scores, mental ages, and I. Q.'s of the four cases having been discussed and the differences noted, the next logical step is to compare the scores of the total groups. Table XXVII gives the distribution of scores of *all* of the pupils in the continuation schools together with

the percentage of cases in each class interval. Table XXVIII gives the same information for *all* the pupils tested in the regular schools and used for comparative purposes. The range for 14-year-olds in continuation school is from 10 up to 170; for the same age in regular school, 20 up to 210, or

TABLE XXVII

DISTRIBUTION OF SCORES OF *All* PUPILS IN CONTINUATION SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
200-190 .....	..	...	2	.24
190-180 .....	..	...	1	.12
180-170 .....	..	...	2	.24
170-160	2	.66	8	.96
160-150	1	.33	25	3.
150-140	13	4.2	44	5.2
140-130	13	4.2	49	5.8
130-120	17	5.6	61	7.3
120-110	26	8.5	84	10.
110-100	42	13.8	97	11.6
100-90	38	12.5	101	12.1
90-80	42	13.8	108	12.9
80-70	42	13.2	108	12.9
70-60	27	8.9	53	6.3
60-50	19	6.2	69	8.2
50-40	11	4.3	34	4.
40-30	15	5.6	30	3.6
30-20 .....	..	...	11	1.3
20-10	1	.33	3	.36
	307		890	

NOTE. This table reads as follows: 13 pupils out of 307, or 4.2 per cent, of 14-year-olds scored between 140 and 150; 25 out of 890, or 3 per cent, of 15-year-olds scored between 150 and 160.

10 points higher at the bottom and 40 at the top. For 15-year-olds in continuation school the variation is from 10 up to 200; in regular school from 20 up to 210, a difference at the top of 10 points. It should be noted that the number of cases of 14-year-olds in the school group is slightly more than three times the number in the continuation group while for 15-year-olds they are practically equal. A distribution of

scores of 14- and 15-year-olds in the continuation and regular schools combined is given in Table XXIX. Here, as would be expected, the range is the same for both years.

Another method of presenting the relationship of distributions is through a graph table. Figures 13 and 14 give a pic-

TABLE XXVIII

DISTRIBUTION OF SCORES OF ALL PUPILS IN REGULAR SCHOOL

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
210-200	1	.1	2	.22
200-190	2	.2	2	.22
190-180	10	1.	16	1.7
180-170	21	2.1	33	3.6
170-160	60	6.	50	5.5
160-150	85	8.5	100	11.
150-140	125	12.5	143	15.73
140-130	131	13.1	132	14.52
130-120	141	14.1	111	12.21
120-110	118	11.8	122	13.42
110-100	103	10.3	86	9.46
100-90	86	8.6	73	8.03
90-80	59	5.9	62	6.82
80-70	32	3.2	16	1.76
70-60	22	2.2	9	.99
60-50	12	1.2	6	.66
50-40	8	.8	3	.33
40-30	2	.2	4	.44
30-20	1	.1	1	.11
	<hr/> 1019		<hr/> 971	

NOTE. This table reads as follows: 21 pupils out of 1019, or 2.1 per cent, of 14-year-olds scored between 170 and 180; 132 out of 971, or 14.52 per cent, of 15-year-olds scored between 130 and 140.

ture of the data given in the three preceding tables based upon the percentage of cases in each class interval. The former is for 14-year-olds; the latter for 15-year-olds. In each figure the continuous line represents the continuation school; the broken line, the regular school; and the third line, the continuation and regular school combined. The medians for each group are shown by vertical basal bars.

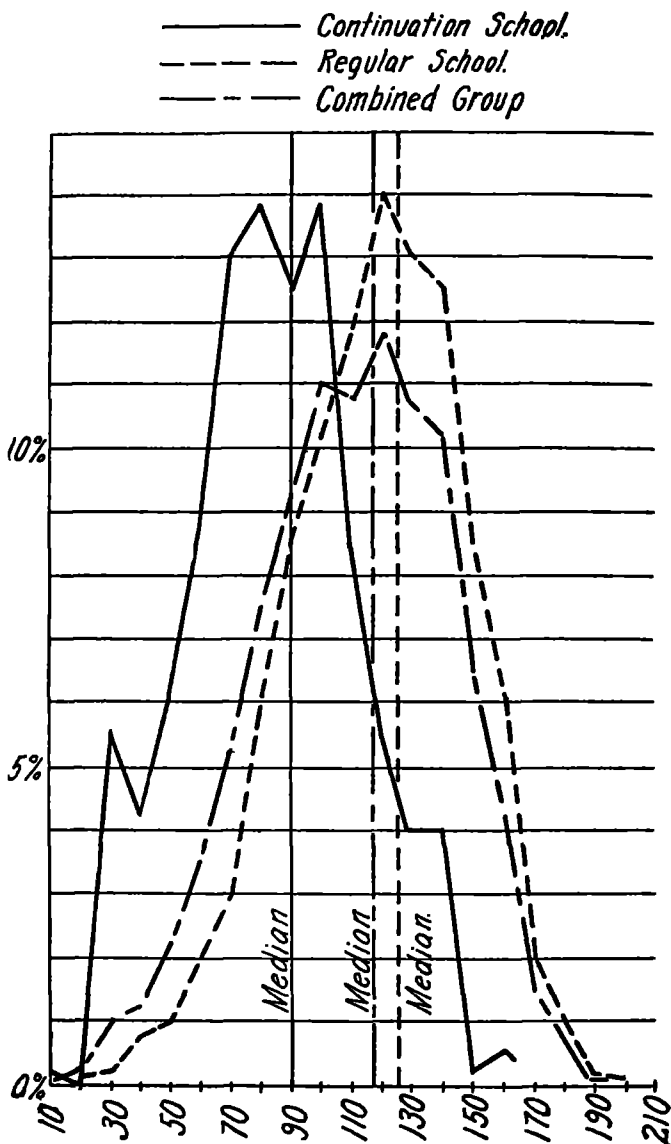


FIGURE 13

Distribution of scores of all 14-year-olds on a percentage basis.
 Medians are shown by lines perpendicular to the base.

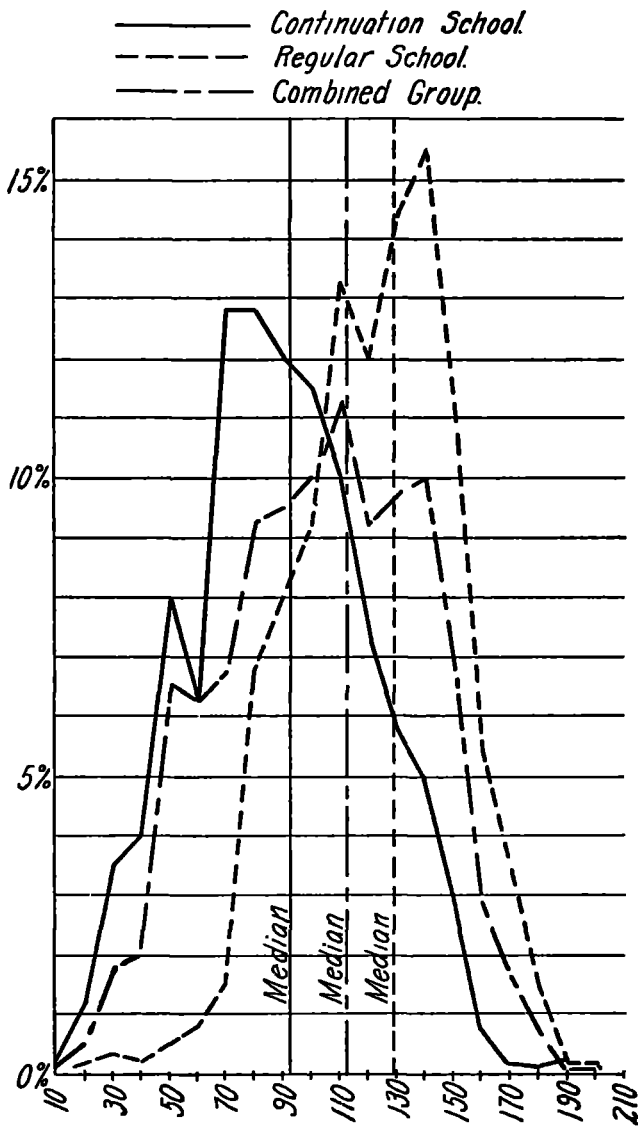


FIGURE 14

Distribution of scores of all 15-year-olds on a percentage basis.
 Medians are shown by lines perpendicular to the base.

The *first* point to be noted is that the curves of the combined groups for both 14- and 15-year-olds approximate more nearly the symmetrical form of distribution than any other type. This is more clearly the case with the former than with

TABLE XXIX

DISTRIBUTION OF SCORES OF *Combined* CONTINUATION- AND REGULAR-SCHOOL GROUPS

Score	14-Year-Olds		15-Year-Olds	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
210-200	1	.076	2	.11
200-190	2	.152	4	.22
190-180	10	.76	17	.93
180-170	21	1.5	35	1.9
170-160	62	4.7	58	3.1
160-150	86	6.5	125	6.8
150-140	138	10.4	187	10.2
140-130	144	10.9	181	9.9
130-120	158	11.9	172	9.4
120-110	144	10.9	206	11.3
110-100	145	11.	183	10.
100-90	124	9.4	174	9.5
90-80	101	7.6	170	9.3
80-70	72	5.4	124	6.8
70-60	49	3.7	62	3.4
60-50	31	2.3	75	4.1
50-40	19	1.4	37	2.1
40-30	17	1.2	34	1.9
30-20	1	.076	12	.66
20-10	1	.076	3	.16
	1326		1861	

NOTE. This table reads as follows: 124 pupils out of 1326, or 9.4 per cent, of 14-year-olds scored between 90 and 100; 125 out of 1861, or 6.8 per cent, scored between 150 and 160.

the latter. This fact is commonly used as a measure of the reliability of tests and indicates that, on the whole, both the 14- and 15-year-olds represent unselected groups.

A *second* fact is that the regular-school group in both figures rises above the combined curve at all points indicating the higher grades of intelligence and falls below at all points

indicating the lowest grades. For the continuation school this is just the opposite. Here the curve falls below that of the combined group at all points indicating both the highest and lowest grades of intelligence. For 14-year-olds the continuation curve is farther below the combined curve than is that for 15-year-olds, the latter following very closely the outline of the regular-school group. This is probably due to the fact that there are three times as many cases in the regular school as in the continuation school, as was pointed out above.

A *third* important point is that the regular-school distribution in each case is much superior to that of the continuation school. In relation to the combined group the former is skewed toward the highest scores, while the latter leans toward the lowest.

Fourth, the medians for the regular- and continuation-school groups are far apart. The former is above that of the combined group and the latter below. The percentages of continuation pupils scoring above the median of the school group are 12.05 per cent for 14-year-olds and 15.17 per cent for 15-year-olds. The percentages of regular-school pupils overlapping the median of the combined group are 60 per cent for 14-year-olds and 69.35 per cent for 15-year-olds. By the same measure the continuation-school figures are 17.52 per cent for 14-year-olds and 28.18 per cent for 15-year-olds.

Fifth, the curve of 15-year-olds in school is weighted more to the right of the combined distribution than that for 14-year-olds. While this is apparent from the figure, the best indication is that 9.35 per cent more cases scored above the combined median than was true of 14-year-olds in relation to their combined medians. It would seem, then, that the higher up one went in the school system, the more selected the group would be and the more the curve of intelligence would be weighted toward the upper end. This ought to mean that

the colleges receive, from the high schools, students whose mental ability is much better than the average.¹

MEDIAN-SCORE DIFFERENCES, CONTINUATION-SCHOOL, REGULAR-SCHOOL, AND COMBINED GROUPS

The median scores for the continuation-, regular-school, and combined groups are given in Table XXX. The 15-year-olds were slightly higher than the 14-year-olds except in the case of the combined group and here the effect of three times the

TABLE XXX

MEDIAN SCORES OF CONTINUATION-, REGULAR-SCHOOL, AND COMBINED GROUPS

Age	(1) Median Continua- tion	(2) Median Combined Group	(3) Median Regular School	(4) Difference between 1 and 2	(5) Difference between 2 and 3	(6) Difference between 1 and 3
14 years	89.64	117.15	124.71	27.51	7.56	35.07
15 years	92.87	112.74	129.32	19.87	16.58	36.45
Difference	3.23	4.41*	4.61	7.64*	9.02	1.38

* In favor of 14-year-olds.

number of cases in the regular-school distribution is seen, as the median exceeds that for 15-year-olds. This also affects the differences, making them high between the continuation and combined groups and low between the combined and regular-school groups. The most striking fact is given in the last column. This is that the difference in scores between the continuation- and regular-school groups is 35.07 points for 14-year-olds and 36.45 points for 15-year-olds.

COMPARISON OF MEDIAN MENTAL AGES AND RELIABILITY OF FINDINGS

The median mental ages for the three groups are given in Table XXXI. The pupils concerned in this investigation are

¹ Evidence in favor of this is given by Proctor, W. M., *Intelligence Tests and the Guidance of High School Pupils*, p. 64. On the other hand, the opposite conclusion was reached by Book, W. F., *The Intelligence of High School Seniors*, p. 299.

somewhere within the period when mental growth ceases and adult intelligence is reached. Professor Terman has placed the average adult mental age at 16 years, Professor Dearborn's recent investigations have led him to place it at 14 years to 14 years, 6 months, and the results of the Alpha examinations in the army show it to be 13 years. The mental age of our combined group is 14 years, 3 months for 14-year-olds and 14 years for 15-year-olds, or approximately within the limits set by Professor Dearborn. That for the continuation school is 12 years, 4 months for 14-year-olds and 12 years, 7 months for 15-year-olds, or very close to that found in the army. That of the regular-school group is 14 years, 10 months for 14-year-olds and 15 years, 1 month for 15-year-olds. While this is higher than that of the combined group, it is still nearer the range set by Dr. Dearborn than by Professor Terman. It was pointed out in Chapters II and IV that *all* the pupils between the ages of 14 and 16 in these communities were examined. The selection from the regular schools in the other two cities was made near the median of the age-grade distribution and the median results checked very closely with those found in the places where *all* the pupils were tested, as was indicated at the beginning of this chapter. It would seem, therefore, that the median of our combined group based upon 3187 cases was a fairer indication of the median adult mental age than that found by Professor Terman in testing "30 business men and 150 'migrating' unemployed men, 150 adolescent delinquents and 150 high school students" a total of 480 individuals.¹

While our median mental ages for the continuation-school groups are very close to the medians found in the army, by all the tests applied in this investigation, these pupils are mentally inferior to the combined group by 1 year and 11 months for 14-year-olds and 1 year and 5 months for 15-year-olds;

¹ Terman, L. M., *The Measurement of Intelligence*, p. 54.

also to the regular-school group by 2 years and 6 months. The writer feels, therefore, that, as far as the results of this investigation bear on the point, to accept 13 years as the average adult intelligence would be as far from the facts as to take the 16 years of Professor Terman, and that the low results in the army were due to (1) the type of test employed; (2) the selection of cases; and (3) the conditions under which it was given.

The most significant comparison, however, is given in column 6. This shows that the median mental age of the

TABLE XXXI

MEDIAN MENTAL AGES OF CONTINUATION-, REGULAR-SCHOOL, AND COMBINED GROUPS

Age	(1) Median Continuation Yrs. Mos.		(2) Median Combined Group Yrs. Mos.		(3) Median Regular School Yrs. Mos.		(4) Difference between 1 and 2 Yrs. Mos.		(5) Difference between 2 and 3 Yrs. Mos.		(6) Difference between 1 and 3 Yrs. Mos.	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
14 years	12	4	14	3	14	10	1	11	..	7	2	6
15 years	12	7	14	..	15	1	1	5	1	1	2	6
Difference	3		3*		3		6*		6		0	

* In favor of 14-year-olds.

school group exceeds that in the continuation school by 2 years and 6 months. Let us assume now that these median pupils entered the first grade together at the age of 6. One would have a mental age of 6 years, and the other 4 years and 9 months. They would go on through the school, year after year, the one doing the work adapted to his mental ability and the other hopelessly at a disadvantage at the beginning and increasingly so each year, for (1) the succeeding work is based upon that of the year before, and (2) his annual unit of mental growth is smaller than that of the normal child. We would naturally expect, then, that there would come a time when the handicap would be too great and the mentally inferior pupil would drop out of school. Of course, by law, this could not be until after he had reached his 14th birthday

and completed the requirements of graduation from the 6th grade.¹

COMPARISON OF MEDIAN INTELLIGENCE QUOTIENTS

The I. Q. of the median child for the continuation-, regular-school, and combined groups is given in Table XXXII. This shows that the I. Q. of the combined 14-year-olds is 98, or within 2 points of being normal, while for 15-year-olds it is 97, or within 3 points of it. On the other hand, the median

TABLE XXXII

I. Q. OF THE MEDIAN CHILD IN CONTINUATION-, REGULAR-SCHOOL, AND COMBINED GROUPS

Age	(1) Median Continua- tion	(2) Median Combined Group	(3) Median Regular School	(4) Difference between 1 and 2	(5) Difference between 2 and 3	(6) Difference between 1 and 3
14 years	85	98	102	13	4	17
15 years	87	97	104	10	7	17
Difference	2	1*	2	3*	3	0

* In favor of 14-year-olds

I. Q. for the continuation school is 85 and 87 for 14- and 15-year-olds respectively, or 13 and 10 points below that of the combined group. The regular-school group, however, shows 102 and 104 for 14- and 15-year-olds, which is 4 and 7 points above those of the combined group and exactly 17 points above the continuation-school group for both years.

DIFFERENCE IN THE RANGE OF THE MIDDLE FIFTY PER CENT

The final picture of the relationship between these three groups is given in Figure 15. This shows the range of the middle 50 per cent of regular and continuation school 15- and 14-year-olds in relation to the same measure for their com-

¹ This is the Massachusetts law. In the country as a whole, the compulsory attendance age varies from 12 years with no definite educational requirement to 16 years with graduation from the 8th grade.

bined groups. As may be seen from an inspection of the figure, the record of the middle 50 per cent of the regular-school group is higher than that of the combined group and that of the continuation school is lower. This is true for both

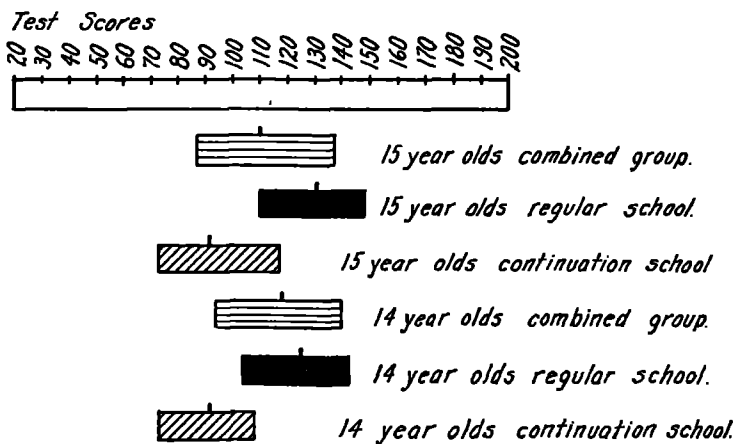


FIGURE 15

Scores made by the middle 50 per cent of the combined groups in comparison with those in regular and continuation schools. The vertical cross bar shows the median. The scale at the top of the figure gives the test scores.

ages. Other points, previously discussed, such as the difference in median scores between the groups and the differences between 14- and 15-year-olds, are clearly shown.

CONCLUSION

From the foregoing discussion it will be seen that on every point of comparison the inferiority of the continuation-school pupils is found. Not only do they fall below the regular-school group in median score, mental age, and I. Q., but they show also marked inferiority, in these same measures, when compared with the combined continuation- and regular-school groups. One cannot escape the conclusion that the question of low intelligence must be given serious consideration in any discussion of why pupils of these ages leave school to go to work.

CHAPTER VII

SEX DIFFERENCES

DIFFERENCES IN MENTAL TRAITS

ONE of the earliest attempts to see if there were any differences between the sexes in mental traits was made by Mrs. Wooley (Helen B. Thompson) ¹ approximately twenty years ago. She selected twenty-five of each sex from the two upper classes of the University of Chicago and tested them in forty-five separate traits. In twenty-one of these the men exceeded the women by greater or less amounts; in twenty-one the women exceeded the men; and in three they were approximately equal. The experiment fell into seven groups, dealing respectively with motor ability, skin and muscle senses, taste and smell, hearing, vision, intellectual faculties, and affective processes. For our purposes only the ones dealing with the intellectual processes are of importance. It was found that, in rote memory of nonsense syllables and retention after one week, the women exceeded the men; while in ability to solve ingenuity tests the men were better than the women. On a general information test they were approximately equal. When this was weighted, however, on the side of English literature, only 31 per cent of the men scored above the median for women; yet, when it was weighted on the side of physics, 76 per cent of the men surpassed the median of the other sex.

In 1910 Bonser ² studied the reasoning ability of 385 boys and 757 girls who were in grades 4, 5, and 6, and whose ages

¹ Thompson, Helen B., "Psychological Norms in Men and Women"; *University of Chicago Contributions to Philosophy*, vol. 4, No. 1, 1903.

² Bonser, F. B., *The Reasoning Ability of Children*, 1910.

ranged from 8 up to 16 years. The tests given were for (1) mathematical judgment; (2) controlled association; (3) selective judgment; and (4) interpretation of poems. The boys were found to be superior in the first three, while the girls were better in the last. On a chronological-age basis the boys were superior to the girls in total score at all ages up to 12 years, and after that the girls were superior.¹ The leadership of the girls during the ages of 12 and 13 was very noticeable. Beyond these, the number of cases was too few to warrant definite conclusions.

Ebbinghaus² found that on his completion test the girls were superior to the boys at all ages from 13 up to 19 years inclusive. His results were later confirmed by Cohn and Dieffenbacher³ in the schools of Breslau. The writer found the same results with the Trabue completion test.

Pyle⁴ gave a substitution test to 3053 boys and 3260 girls whose ages ranged from 8 up to 18 years. At the two lowest ages the average scores of the different sexes were practically equal. At 10 years the girls begin to exceed the boys. The amount continues to increase each year until at 13 the peak is reached, and thereafter it gradually diminishes, except at the 18th year, when it increases again; but the number of cases is so small, only 52, as to make this result open to question.

On opposites tests, all the investigators consulted rate them as being favorable to the girls. Pyle⁵ found that at the ages of 8 and 9 the boys exceeded the girls in average score, but from 10 up to 18 the girls exceeded the boys by greater

¹ Bonser, F. B., *op. cit.*, pp. 33, 50, 64, 65, 71.

² Ebbinghaus, H., *Ueber eine neuer Methode zur Prüfung geistiger Fähigkeiten und ihre Anwendung bei Schulkindern*, 1897.

³ Cohn, J., and Dieffenbacher, J., "Untersuchungen über Geschlechts-Alters und Begabungs-Unterscheide bei Schülern"; *Beihefts zur Z Ang Ps* 5, vol. 2, pp. 30-36 (1905).

⁴ Pyle, W. H., *The Psychology of Learning*, p. 178 (1921).

⁵ Idem, *The Examination of School Children*, 1913.

or less amounts. Hollingworth¹ found women faster than men in naming opposites, both before and after practice. Burt and Moore² report that in one group only 29.2 per cent and in another only 42.2 per cent of boys reached the median marks of girls. Wooley and Fischer³ report a slight superiority for girls but state that it is too small to be considered very significant.

In analogies, Burt⁴ found that in the Wallasley School, Liverpool, only 35 per cent of the boys reached the median of the girls. Whipple,⁵ however, found that among Cornell University students sex differences were too slight to be noted.

It was pointed out above in a discussion of the study of Mrs. Wooley that women exceeded men in rote memory. This point has been confirmed by Burt and Moore,⁶ Kirkpatrick,⁷ Pohlmann,⁸ and others. Further investigations have tended to show that women also exceed men in logical memory of ideas. Wissler,⁹ in a study of Columbia freshmen, found an average of 44.5 for men and 48.2 for women. Whipple¹⁰ found among college students a difference of 15 points of average score in favor of women. Numerous other experimenters in this same field have all secured similar re-

¹ Hollingworth, H. L., "Articulation and Association"; *Journal of Educational Psychology*, vol. 6, pp. 99-105.

² Burt, C., and Moore, R. C., "The Mental Differences between the Sexes"; *Journal of Educational Pedagogy*, vol. 1, pp. 273-284.

³ Wooley, Helen T., and Fischer, Charlotte R., "Mental and Physical Measurements of Working Children"; *Psychological Review*, vol. 18, pp. 213-227.

⁴ Burt, C., "Experimental Tests of Higher Mental Processes and their Relation to General Intelligence"; *Journal of Educational Pedagogy*, vol. 1, p. 93.

⁵ Whipple, G. M., *Manual of Mental and Physical Tests*, p. 459 (1910).

⁶ Burt, C., and Moore, R. C., *op. cit.*, pp. 273-284.

⁷ Kirkpatrick, E. A., "An Experimental Study of Memory"; *Psychological Review*, vol. 1, pp. 602-609.

⁸ Pohlmann, A., *Experimentelle Beiträge zur Lehre vom Gedächtnis*, pp. 134-140 (1906).

⁹ Wissler, C., "The Correlation of Mental and Physical Tests"; *Psychological Monthly*, vol. 3, p. 62.

¹⁰ Whipple, G. M., *op. cit.*, p. 579.

sults. One of the chief difficulties with many of these earlier studies, however, arises from the fact that it is hard to be sure that an average sampling of the sexes was made in each case. For example, women in coeducational colleges may be a more selected group than men.

In a mental survey of the schools of Utah, Snoddy ¹ found that in such special abilities as solving mazes and block-counting, the boys of all ages were much superior to the girls. In completing lines and comparing numbers, however, the girls were much superior to the boys.

DIFFERENCES IN SCHOOL ACHIEVEMENT

Sufficient evidence has been given to show that, as far as we are able to measure, women are superior to men in some mental traits and men are superior to women in others. An examination of some special abilities dependent upon school training will yield the same results. Courtis ² found that in multiplication, involving simply skill in the fundamental process, the girls exceeded the boys in average score in all grades from 4A to 12B inclusive. Starch ³ found that in reasoning ability in arithmetic the boys were ahead of the girls in all grades from 4 to 8. Thorndike ⁴ found a like result in grades 6 to 9 inclusive. Approximately 60 per cent of the boys scored above the median of the girls.

It was pointed out by Judd ⁵ that, in a study of 5118 boys and girls of St. Louis, the girls were superior to the boys in oral reading in all grades after the first. The amount of su-

¹ Snoddy, G. S., *Mental Survey of Utah Schools*, p. 23 (1921).

² Courtis, S. A., *Report of the Committee on Inquiry, Board of Estimate and Apportionment, New York City*, vol. 1, pp. 524, 525 (1912).

³ Starch, Daniel, "Scale for Measuring Ability in Arithmetic"; *Journal of Educational Psychology*, vol. 7, pp. 213-222.

⁴ Thorndike, E. L., "Measurement of Ability to Solve Arithmetic Problems"; *Pedagogical Seminary*, vol. 21, pp. 213-222.

⁵ Judd, Charles H., *Survey of the St. Louis Public Schools*, vol. 2, p. 139 (1918).

periority was equal to the progress made in one fourth to one third of a year.

Lockett,¹ by the use of the Buckingham scale in spelling, found that the median scores of boys and girls were about equal in grades 2, 3, and 4. Beginning with grade 5, the girls began to show superiority, and the amount increased in the next two grades, which was as far as the experiment was carried.

Van Wagnen² found that on his history scales the girls exceeded the boys in median score for all grades from 5 to 8 inclusive. In grade 4 the results were practically equal.

The writer does not propose to cite further literature bearing on this point. He believes that enough has been given to show that sex differences in the field of subject matter vary in much the same way as pointed out under mental traits.

DIFFERENCES IN GENERAL INTELLIGENCE

We will now examine briefly differences in the field of general intelligence. Using the Stanford-Binet tests on 457 boys and 448 girls ranging from 5 up to 14 years of age, Professor Terman³ found very slight superiority in the I. Q.'s of the girls up to 13 years. At this point the two curves crossed, and thereafter the boys were superior. He concludes that the difference is so slight "that for all practical purposes it would seem negligible." In a later book⁴ Professor Terman found, by studying 65 boys and 47 girls in kindergarten, that the median I. Q. of the girls was 5 points higher than that of the boys. From these data he modifies his position relative to sex differences, for he concludes that "it is probable that, age

¹ Lockett, L. W., "Measuring a School System by the Buckingham Scale"; *School and Society*, vol. 2, pp. 894-898.

² Van Wagnen, M. J., "Historical Information and Judgment in Pupils of Elementary Schools"; *Teachers College Contributions to Education*, No. 101, p. 74 (1919).

³ Terman, L. M., *The Measurement of Intelligence*, p. 69 (1916).

⁴ Idem, *The Intelligence of School Children*, pp. 34, 35 (1919).

for age, girls are slightly superior to boys in the kind of intellectual ability measured by the usual type of intelligence test. This conclusion is borne out by many other investigations by the test method."

Woodrow,¹ in a study of the mental ages of 100 boys and girls between 10 and 11 years of age in the schools of Minneapolis, found that, while the chronological ages averaged the same, 10 years and 5 months, the mental age of the girls was 10 years and 6 months and that of the boys 10 years and 1 month, a difference of 5 months. On the other hand, Book² studied 5748 seniors in Indiana high schools, with the Pressey Intelligence Scale. He found the median score for boys 138.9 points; for girls 135.8 points — a difference of 3.1 points. The percentage of boys making scores above the median of girls was 56.2 per cent, while only 41.4 per cent of girls made scores above the median for boys.

The writer does not propose to enter into a theoretical discussion of general intelligence, but a few generalizations are necessary for the purpose at hand. Psychologists tell us that responses are the result of specific stimuli, so that the only way in which a general survey of mental ability can be secured is to take the sum total, or a cross-section, of those specific responses which are believed to be desirable in a normal individual. Consequently, general intelligence tests are made up of material designed to test the ability of the individual in such functions as range of information, logical memory, analogy, arithmetical reasoning, etc. The foregoing discussion has shown that in some of these specific abilities the boys are superior, while in others the girls are superior. It is very possible, then, in making a general intelligence examination, to include more material weighted toward the girls than toward the boys, or *vice versa*, in which case the results would not be a reliable index of sex differences.

¹ Woodrow, Herbert, *Brightness and Dullness in Children*, p. 31 (1919).

² Book, W. F., *op. cit.*, pp. 270, 271 (1921).

RELIABILITY OF DEARBORN TESTS AS A MEASURE OF SEX DIFFERENCES

We will consider now whether or not the test used in this investigation can be safely taken as a measure of sex differences. The separate tests which make up this mental examination have been carefully analyzed and rated as to their

TABLE XXXIII

PROBABLE WEIGHT OF DIFFERENT TESTS IN DEARBORN, SERIES II,
BETWEEN BOYS AND GIRLS

Test	Weight	Authority
1. Picture Sequence	Girls	Whipple
2. Word Sequence	Girls	Whipple
3. Form Completion	Boys	{ Stacey *
		{ Bonser
4. Opposite Completion	Girls	{ Ebbinghaus, Pyle
		{ Hollingworth
		{ Burt and Moore
5. Memory Ladders	Girls	Thompson, Courtis
6. Picture Symbols	Boys	Bonser
7. Mazes	Boys	Snoddy
8. Disarranged Proverbs	Neutral	
9. Faulty Pictures	Neutral	Snoddy
10. Number Problems	Boys	{ Thorndike, Starch
		{ Thompson
For Girls		4
For Boys		4
Neutral		2

* Stacey, F. W., *The Interrelation of Mental Abilities*, p. 58 (1921).

weight for the different sexes. The results as given in Table XXXIII show that four are undoubtedly favorable to the girls, an equal number are on the side of the boys, and two are neutral. The writer feels, therefore, that the test used is a reasonably safe measure of sex differences at these ages, and that whatever variation there may be between boys and girls must be accounted for on grounds other than the probable error of the test itself.

SEX DIFFERENCES IN CONTINUATION SCHOOLS

In the present investigation there were in the continuation schools 151 girls and 156 boys, 14 years of age; 443 girls and 447 boys, 15 years of age. Table XXXIV gives the distribution of the scores of the 14-year-old boys and girls, and Table XXXV gives the same data for 15-year-olds. For both of

TABLE XXXIV
DISTRIBUTION OF SCORES OF 14-YEAR-OLDS IN CONTINUATION SCHOOL

Score	<i>Girls</i>		<i>Boys</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
170-160 .....	..	...	2	1.3
160-150 .....	..	...	1	.65
150-140	5	3.3	8	5.2
140-130	5	3.3	8	5.2
130-120	6	4.	11	7.1
120-110	9	7.	17	11.
110-100	21	14.	21	13.6
100-90	17	11.3	21	13.6
90-80	25	16.7	17	11.
80-70	21	14.	19	12.3
70-60	15	10.	12	7.8
60-50	6	4.	13	8.4
50-40	6	4.	5	3.7
40-30	14	9.	1	.65
30-20 .....	..	...	..	...
20-10	1	.67	..	...
	<hr/>		<hr/>	
	151		156	

NOTE. This table reads as follows: 9 girls out of 151, or 7 per cent, scored between 110 and 120; 8 boys out of 156, or 5.2 per cent, scored between 130 and 140.

these ages the boys exceed the girls at the quartile points as is shown in Tables XXXVI and XXXVII.

The median score for 14-year-old boys was 95.23; for girls 85. The range in score for the middle 50 per cent was 74.21 to 114.70 for the boys, and 67.16 to 103.92 for the girls. The median score for 15-year-old boys was 99.22; for girls 86.04. The range in score of the middle 50 per cent was 77.81 to 119.69 for boys, and 63.56 to 109.40 for girls.

TABLE XXXV

DISTRIBUTION OF SCORES OF 15-YEAR-OLDS IN CONTINUATION SCHOOL

Score	<i>Girls</i>		<i>Boys</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
200-190 .....	..	...	2	.46
190-180 .....	..	...	1	.23
180-170 .....	..	...	2	.46
170-160	1	.23	7	.91
160-150	7	1.6	18	3.3
150-140	25	5.7	19	3.5
140-130	26	5.9	23	4.4
130-120	23	5.2	34	8.7
120-110	26	5.9	58	13.3
110-100	46	10.8	51	11.7
100-90	43	10.2	58	13.3
90-80	62	14.2	46	10.5
80-70	52	11.9	56	12.8
70-60	33	7.5	20	4.6
60-50	44	10.1	25	5.7
50-40	24	5.5	10	2.3
40-30	21	4.8	9	2.
30-20	8	1.8	3	.69
20-10	2	.46	1	.23
	443		443	

NOTE. This table reads as follows: 25 girls out of 443, or 5.7 per cent, scored between 140 and 150; 18 boys out of 443, or 3.3 per cent, scored between 150 and 160.

TABLE XXXVI

QUARTILE RANGE OF 14-YEAR-OLDS IN CONTINUATION SCHOOL

Test Score made by	Percentile Groups		
	25	50	75
Boys	74.21	95.23	114.70
Girls	67.16	85.	103.92

TABLE XXXVII

QUARTILE RANGE OF 15-YEAR-OLDS IN CONTINUATION SCHOOL

Test Score made by	Percentile Groups		
	25	50	75
Boys	77.81	99.22	119.69
Girls	63.56	86.04	109.40

The best indication of the comparative mental strength of the sexes is the percentage of boys making scores above the median score for the girls. For 14-year-olds this was 68.1 per cent; for 15-year-olds, 62.5 per cent. On the other hand, if we take the percentage of girls who scored above the median for the boys we find this to be 33.4 per cent for 14-year-olds and 36.1 per cent for 15-year-olds.

The frequency curves for 14- and 15-year-olds are given in Figures 16 and 17. The continuous line in each case represents the girls; the broken line, the boys. Median scores are shown by vertical basal bars. The curve for boys rises above that for girls at nearly all points indicating both the higher

TABLE XXXVIII

DISTRIBUTION OF SCORES OF 14-YEAR-OLDS IN REGULAR SCHOOL

Score	<i>Girls</i>		<i>Boys</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
210-200	1	.19	..	...
200-190 .....	..	...	2	.44
190-180	1	.19	9	1.9
180-170	9	1.7	12	2.6
170-160	30	5.7	30	6.6
160-150	48	9.1	37	8.1
150-140	56	10.6	69	15.1
140-130	75	14.2	56	12.3
130-120	68	12.9	73	15.
120-110	70	13.3	48	10.5
110-100	61	11.5	42	9.2
100-90	47	8.9	39	8.5
90-80	36	6.8	23	5.
80-70	21	3.9	11	2.3
70-60	14	2.6	8	1.7
60-50	3	.57	9	1.9
50-40	1	.19	7	1.5
40-30	1	.19	1	.22
30-20	1	.19	..	...
	543		476	

NOTE. This table reads as follows: 30 girls out of 543, or 5.7 per cent, scored between 160 and 170; 48 boys out of 476, or 10.5 per cent, scored between 110 and 120.

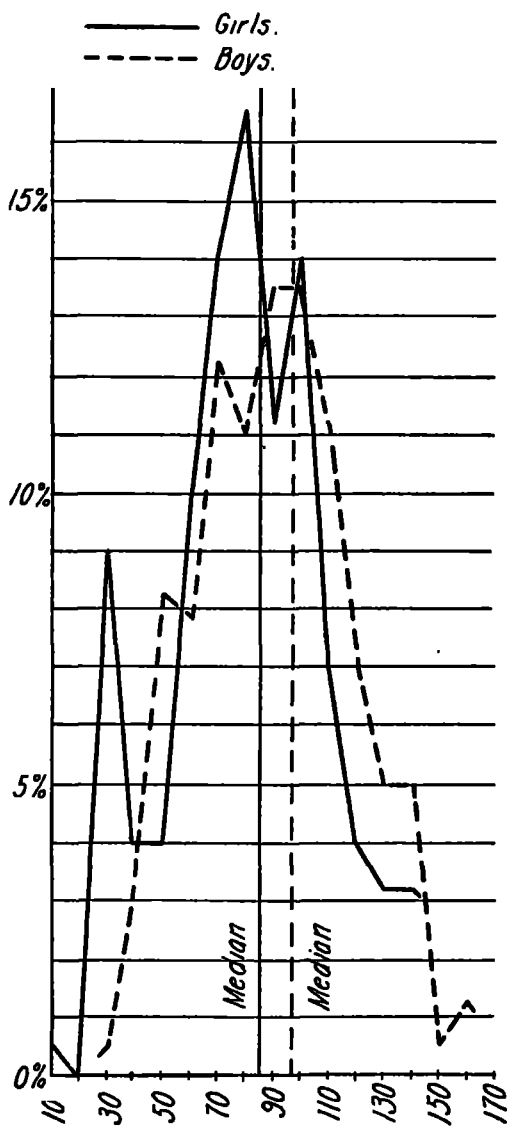


FIGURE 16

The distribution of scores of boys and girls 14 years of age in continuation school on a percentage basis. Medians are shown by lines perpendicular to the base.

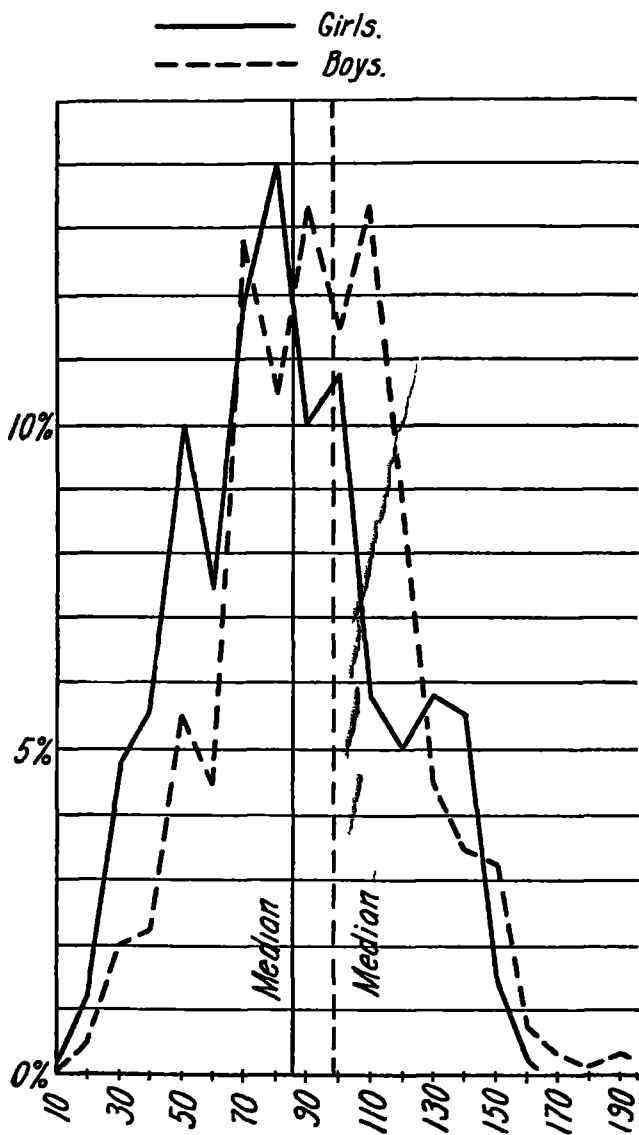


FIGURE 17

The distribution of scores of boys and girls 15 years of age in continuation school on a percentage basis. Medians are shown by lines perpendicular to the base.

and lower grades of intelligence. This is true for both 14- and 15-year-olds. This means that a larger percentage of boys than of girls make the higher ratings on the intelligence tests, and a smaller percentage of boys make the lower ratings.

SEX DIFFERENCES IN REGULAR SCHOOL

A very pertinent question would be whether or not a difference was found between the sexes in the regular-school group. This evidence, therefore, will be presented. Of the 1099 14-year-olds tested, 543 were girls and 476 boys. This is approximately three and one half times the number in the continuation school. Of 15-year-olds there were 971 examined,

TABLE XXXIX

DISTRIBUTION OF SCORES OF 15-YEAR-OLDS IN REGULAR SCHOOL

Score	<i>Girls</i>		<i>Boys</i>	
	No. of Cases	Percentage of Cases	No. of Cases	Percentage of Cases
210-200	1	.18	1	.26
200-190 .....	..	...	2	.52
190-180	4	.72	12	3.1
180-170	11	1.9	22	5.7
170-160	21	3.7	29	7.5
160-150	52	9.3	48	12.4
150-140	96	17.2	47	12.2
140-130	77	13.2	55	14.3
130-120	73	13.1	38	9.8
120-110	79	14.2	43	11.1
110-100	57	10.2	29	7.5
100-90	45	8.1	28	7.2
90-80	42	7.5	20	5.2
80-70	13	2.3	3	.78
70-60	5	.9	4	1.04
60-50	1	.18	5	1.3
50-40	1	.18	2	.52
40-30	2	.36	2	.52
30-20	1	.18	..	...
	581		390	

NOTE. This table reads as follows: 11 girls out of 581, or 1.9 per cent, scored between 170 and 180; 12 boys out of 390, or 3.1 per cent, scored between 180 and 190

581 being girls and 390 boys. These numbers are about equal to the 15-year-olds in the continuation group. A distribution of the scores, together with the percentage of cases in each class interval, is given in Tables XXXVIII and XXXIX for 14- and 15-year-olds respectively. For both these ages the boys exceed the girls at the quartile points, as is shown in Tables XL and XLI. The median score for 14-year-old boys

TABLE XL

QUARTILE RANGE OF 14-YEAR-OLDS IN REGULAR SCHOOL

Test Score made by	Percentile Groups		
	25	50	75
Boys	105.	127.94	145.79
Girls	101.51	122.42	126.21

TABLE XLI

QUARTILE RANGE OF 15-YEAR-OLDS IN REGULAR SCHOOL

Test Score made by	Percentile Groups		
	25	50	75
Boys	111.04	133.81	153.43
Girls	106.18	126.09	144.11

was 127.94; for girls, 122.42. The range in score of the middle 50 per cent was 105 to 145.79 for boys, and 101.51 to 126.21 for girls. The median score for 15-year-old boys was 133.81; for girls, 126.09. The range in score of the middle 50 per cent was 111.04 to 153.43 for boys, and 106.18 to 144.11 for girls. The percentage of boys making scores above the median for girls for 14-year-olds was 56.7 per cent; for 15-year-olds, 58.7 per cent. On the other hand, the percentage of girls making scores above the median for boys for 14-year-olds was 43 per cent; for 15-year-olds, 39.2 per cent.

The frequency curves for 14- and 15-year-olds are given in Figures 18 and 19. The continuous line, in each case, represents the girls; the broken line, the boys. Median scores are shown by vertical basal bars. While the condition is not as marked as in the continuation school, here also the curve

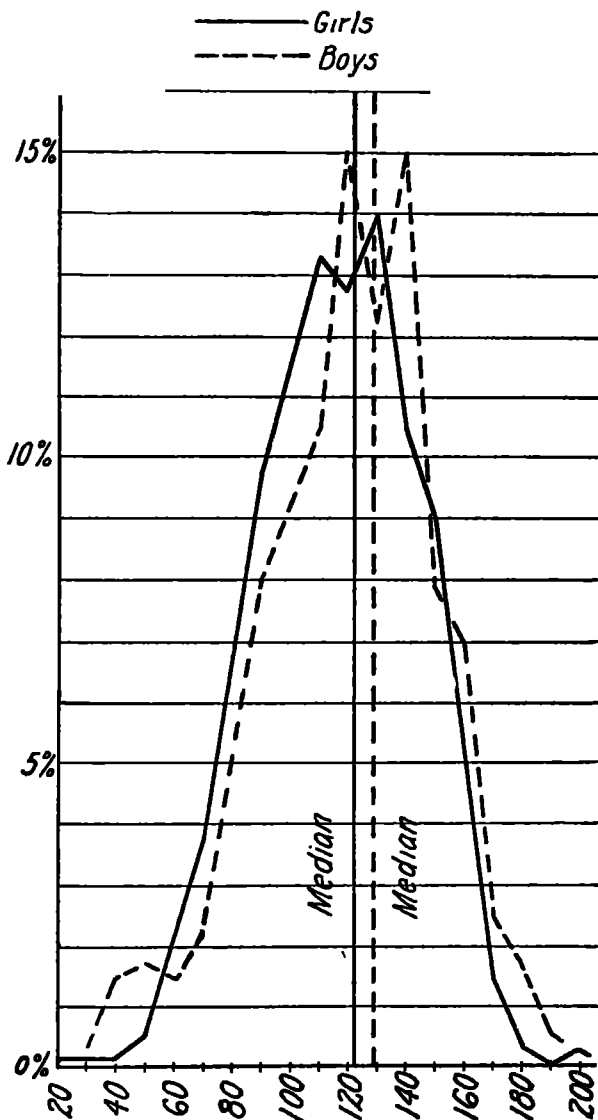


FIGURE 18

The distribution of scores of boys and girls 14 years of age in regular school on a percentage basis. Medians are shown by lines perpendicular to the base.

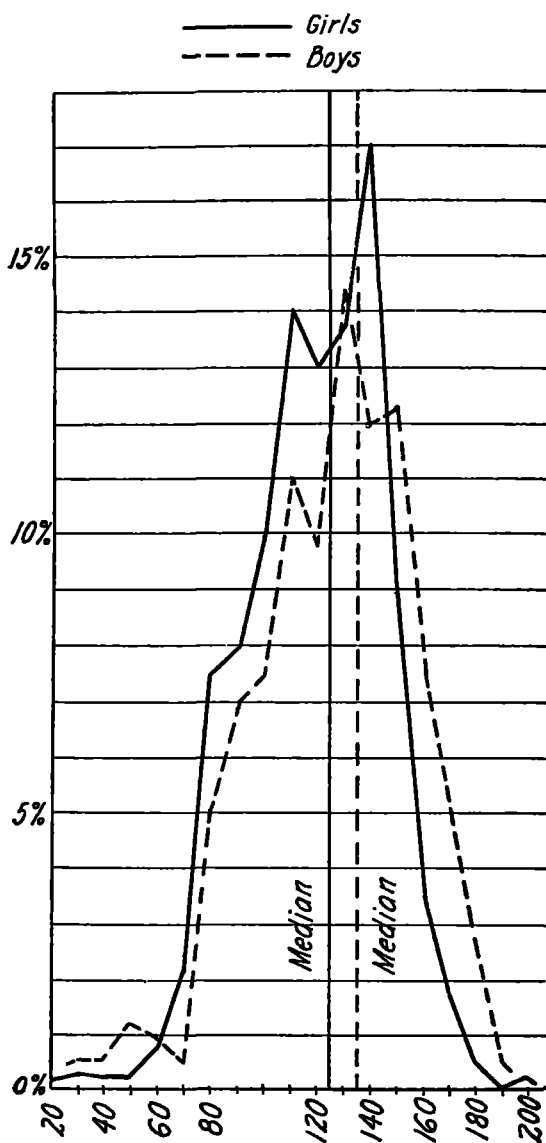


FIGURE 19

The distribution of scores of boys and girls 15 years of age in regular school on a percentage basis. Medians are shown by lines perpendicular to the base.

for boys rises above that for girls at nearly all points indicating both the higher and lower grades of intelligence.¹ This is true for both the 14- and 15-year-olds, and indicates that a higher percentage of boys make the higher ratings and a lower percentage make the lower ratings. Two facts stand out prominently in the above comparisons of the records made in the intelligence tests by our total groups of boys and girls: (1) the consistent superiority shown by the boys in all of these comparisons; (2) the differences between the sexes were greater in the continuation than in the regular school.

REASONS FOR SUPERIORITY OF BOYS

The most obvious explanation of this superiority of the boys is their wider experiences. It is generally conceded that ultimately every woman expects to be a home-maker, and from earliest childhood her education is directed toward that end. She is trained in the virtues of modesty, patience, emotional control, attention to detail, and a long list of inhibitions and limitations to conduct, which usually go under the name of proprieties and conventions. While this may be perfectly good apprenticeship education for the later adult vocation, it cannot possibly furnish the variety of experiences with life that accrue to the boy through his freer, easier, broader contacts and associations. If reactions to situations determine mental growth, and, other things being equal, the broader the contacts with life the greater the resourcefulness in attacking new problems, then it would follow that girls would naturally be at a disadvantage with the boys.

Another explanation of this difference, not so readily apparent, can be made through mental growth. It is generally conceded that, physiologically, girls mature from one to three

¹ This same result was also found by Book, W. F., *op. cit.*, pp. 269-275, and Counts, G. S., *The Selective Character of American Secondary Education*, p. 124 (1922).

years earlier than boys. Baldwin¹ points out that there is a high correlation between physiological and physical age. Woodrow² states that he has found a significant correlation between physical and mental age, and this has been confirmed by Baldwin.³ It would follow, then, that girls mature mentally from one to three years earlier than boys. Physically and physiologically there is a gradual falling off in development after maturity. This fact is pointed out by Baldwin, and was obtained also from charts secured from Dr. Dudley A. Sargent of the Sargent School of Physical Education. That it holds also for mental development is generally accepted, and can easily be confirmed by noting the standard scores of any general intelligence test. These increase, usually, from 9 to 10 years up to 13 or 14, and then gradually fall off.

The superiority of the boys can now be readily explained. With girls maturing from one to three years ahead of boys, the girls, at the ages involved in this investigation, 14 to 16, have been at least a year or more on the slower rate, while the boys have not yet passed the summit. In the data furnished by Dr. Sargent, the curve for girls in height and weight crossed that of the boys at 11 years of age. At 13, the two had recrossed, so that the boys were in the lead. These results agree substantially with those of Baldwin. Gilbert,⁴ back in 1898, secured some data bearing directly on this point. He measured the differences between the sexes in respect to certain mental traits. On the basis of the percentage of boys exceeding the median of the girls, the results were as follows:

	Up to 14 yrs.	14-17 yrs.
Discrimination of weight	48	58
Discrimination of color	39	58
Reaction time	57	76

¹ Baldwin, B. T., "Relation between Mental and Physical Growth"; *Journal of Educational Psychology*, April, 1922, pp. 193-203.

² Woodrow, Herbert, *op. cit.*, p. 114.

³ Baldwin, B. T., *op. cit.*

⁴ Compiled from data given in Thorndike, *Educational Psychology*, vol. 3, p. 182.

	Up to 14 yrs.	14-17 yrs.
Resistance to size weight illusion	55	68
Rate of tapping	64	73

These data show that up to 14 years of age the girls were superior to the boys in two traits. After that age the boys were superior in these same traits, and the percentages in all the others were considerably increased. There ought to be a point somewhere, however, when the two groups come together again. As the figures for both the continuation and regular schools show greater divergence between the sexes at 15 than at 14 years of age, this point must be somewhere beyond 15.

As the ages with which we are dealing are within the period when adult intelligence is reached, it is necessary to point out, for the sake of completeness, that these differences may possibly indicate differences between the adult mental levels of the sexes. This assumption is presented with some caution as it has little evidence in its favor and some against it.¹

REASONS FOR GREATER SEX DIFFERENCES IN CONTINUATION THAN IN REGULAR SCHOOLS

There are a number of explanations for the greater differences which exist between the sexes in the continuation school than in the regular school. First of these would be the variation in the number of cases of each sex. In the continuation the number was about equal; in regular school the girls exceeded the boys by 14 per cent for 14-year-olds and 74 per cent for 15-year-olds. For this reason the continuation-school data would be the more reliable, and the wider differences between the sexes the more accurate.

A second reason for this condition would be that the girls leaving school to go to work were of a lower mental caliber than boys of the same age. The surest way to test this hy-

¹ See Burnham, William H., "Sex Differences in Mental Ability"; *Educational Review*, vol. 62, pp. 273-284.

pothesis would be to examine all the boys and girls 14 to 16 years of age in any community, and study the relationship between the continuation- and regular-school groups. This was done in Case III. The differences found between the sexes are given in Tables XLII and XLIII. The former is for 14-year-olds; the latter for 15-year-olds. The division of cases between boys and girls for both years in the continuation school is almost equal. The same fact holds true for the regular school, except that the numbers, in each instance, are much larger than the corresponding continuation group. In the continuation and regular schools combined, the total numbers of girls and boys for each age-group are within a very few cases — less than ten — of being equal.

The first noticeable fact is that in the 14-year-old continuation group the 25 percentile for girls is 16.49 points below that of the boys, while the median is only 4.13 and the 75 percentile 7.99 points below. Looking now at the 25 percentile for the 14-year regular-school group we note that the girls *exceed* the boys by 2.5 points; while in the 50 and 75 percentile

TABLE XLII

A COMPARISON OF THE QUARTILE DIFFERENCES FOUND BETWEEN
BOYS AND GIRLS IN CASE III

14-Year-Olds — Continuation School

Test Score made by	Percentile Groups		
	25	50	75
Boys	72.11	83.5	99.06
Girls	55.62	79.37	91.07
Difference	16.49	4.13	7.99

14-Year-Olds — Regular School

Test Score made by	Percentile Groups		
	25	50	75
Boys	95.62	123.41	146.35
Girls	98.12	121.56	143.47
Difference	2.5	1.85	2.88

TABLE XLIII

A COMPARISON OF THE QUARTILE DIFFERENCES FOUND BETWEEN
BOYS AND GIRLS IN CASE III

15-Year-Olds — Continuation School

Test Score made by	Percentile Groups		
	25	50	75
Boys	74.70	92.	111.
Girls	65.	83.33	104.37
Difference	9.70	8.67	6.63

15-Year-Olds — Regular School

Test Score made by	Percentile Groups		
	25	50	75
Boys	106.50	132.50	153.21
Girls	112.50	133.09	148.02
Difference	6.	.59	5.19

the girls are *below* the boys by 1.85 and 2.88 points respectively. As the median and 75 percentile differences between the sexes of the two groups are so close together, the reasonable explanation of the great difference in the 25 percentile is that a larger number of girls than of boys of below median mental ability leave school to go to work.

The condition just pointed out for 14-year-olds holds almost as well for 15-year-olds. For the continuation group at the quartile points the boys are ahead of the girls by 9.70, 8.67, and 6.63 points respectively. For the regular-school group the girls *exceed* the boys by 6 points at the 25 percentile, by less than one point at the median, and are *below* the boys 5.19 points at the 75 percentile.

The question might very well be raised as to whether the difference is not due to (1) the particular industry, or (2) the single racial group represented in Case III. The answer to this is that the quartile points of the 15-year-olds in all the other cases were figured, and the same results were secured. In every instance in the continuation school there was a big

difference — as high as 17 points in Case I — in the 25 percentile ranks of boys and girls. This gradually decreased as we went upward on the scale. In the school groups the differences were less at the 25 percentile and gradually increased as the scale ascended. The sex differences for 14-year-olds in the other cases were not figured, as the numbers in continuation school were so small as to make the results unreliable.

RELATIONSHIP BETWEEN THE SEXES IN CONTINUATION AND REGULAR SCHOOLS

For the purposes of this investigation we need also to show the median mental-age differences between the boys and girls in continuation and regular schools. These are given in Table XLIV. They show that the 14-year-old boys in school exceed the continuation-school boys by 2 years and 3 months; while the girls exceed by 2 years and 6 months. For 15-year-olds the regular-school boys have a margin of 2 years and 6 months, and the girls of 2 years and 9 months.

One of the best ways of showing the relationship between groups is by graphical representations. Figure 20 gives a

TABLE XLIV
MEDIAN MENTAL-AGE DIFFERENCES BETWEEN BOYS AND GIRLS IN
CONTINUATION AND REGULAR SCHOOLS

<i>14-Year-Olds</i>			
	Median Continuation Yrs. Mos.	Median Regular School Yrs. Mos.	Difference Yrs. Mos.
Boys.....	12 9	15 ..	2 3
Girls	12 2	14 8	2 6
Difference	7	4	3
<i>15-Year-Olds</i>			
	Median Continuation Yrs. Mos.	Median Regular School Yrs. Mos.	Difference Yrs. Mos.
Boys.....	13 ..	15 6	2 6
Girls	12 2	14 11	2 9
Difference	10	7	3

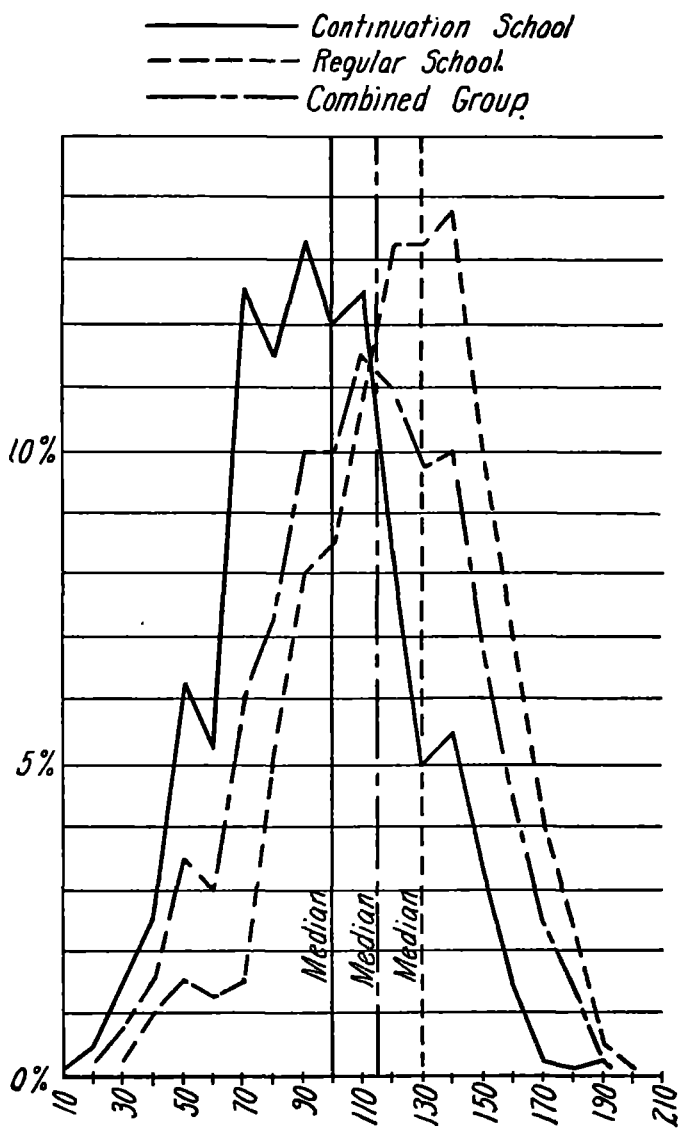


FIGURE 20

Distribution of scores of all boys on a percentage basis. Medians are shown by lines perpendicular to the base.

diagram on a percentage basis of *all* the continuation-school boys together with all of the boys in regular school. The continuous line represents the continuation school; the dotted line, the regular school. The third line represents the curve of the combined groups. Figure 21 gives the same data for *all* of the girls in continuation school as against all the girls in

TABLE XLV

MEDIAN I. Q. OF BOYS AND GIRLS IN CONTINUATION AND REGULAR SCHOOLS

<i>14-Year Olds</i>			
	Median Continuation	Median Regular School	Difference
Boys.....	89	104	15
Girls	84	101	17
	—	—	—
Difference	5	3	2
<i>15-Year-Olds</i>			
	Median Continuation	Median Regular School	Difference
Boys.....	90	107	17
Girls	84	103	19
	—	—	—
Difference	6	4	2

regular school and both combined. In each of these figures the superiority of the school group is easily seen.

The differences in I. Q.'s between the boys and girls of the continuation and regular schools based upon the median mental-age data of Table XLIV is given in Table XLV. This shows that the 14-year-old boys in regular school exceed the continuation boys by 15 points; for girls the difference is 17 points. For 15-year-olds the regular-school boys have a margin of 17 points and the girls of 19 points.

EDUCATIONAL IMPLICATIONS

The question may well be raised as to whether or not the differences between the sexes in general intelligence, as shown above, are large enough to warrant segregated education. For

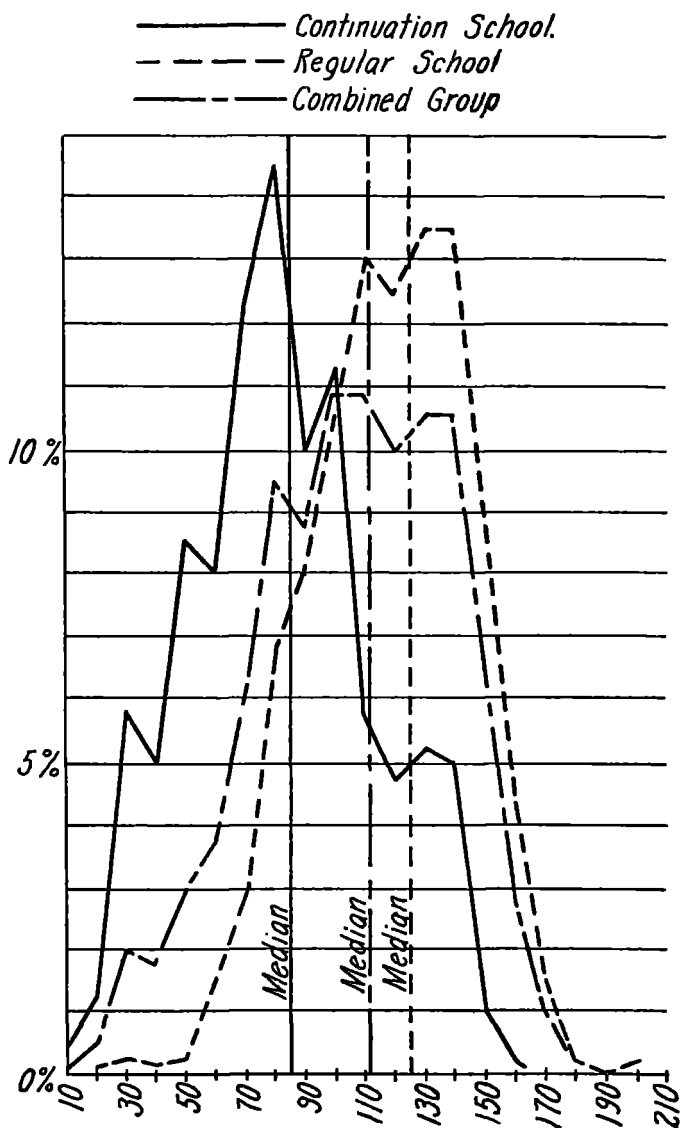


FIGURE 21

Distribution of scores of all girls on a percentage basis. Medians are shown by lines perpendicular to the base.

the classification of pupils in school the mental age is probably at the present time the most reliable criterion. The answer to the above question can be secured, as far as this investigation is concerned, by finding the mental ages to correspond to our quartile scores and noting the differences. This has been done in Tables XLVI and XLVII. Table

TABLE XLVI
MENTAL-AGE RANGE IN CONTINUATION SCHOOL

		<i>14-Year-Olds</i>					
		Percentile Groups					
Mental Age made by		25		50		75	
		Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
Boys.....		11	5	12	9	14	1
Girls		11	..	12	2	13	4
Difference		5		7		9	

		<i>15-Year-Olds</i>					
		Percentile Groups					
Mental Age made by		25		50		75	
		Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
Boys.....		11	8	13	..	14	6
Girls		10	10	12	3	13	9
Difference		10		9		9	

XLVI shows that 14-year-old boys in continuation school are superior to the girls by 5, 7, and 9 months at the 25, 50, and 75 percentile points respectively, while for 15-year-olds the difference is 10, 9, and 9 months. Table XLVII shows that in the regular school, the 14-year-old boys are superior by 4, 4, and 7 months; the 15-year-olds by 4, 7, and 9 months.

While the differences between the sexes in the continuation school are large, — the average being 7 months for 14-year-olds and 9 months for 15-year-olds, — they certainly are not large enough to warrant segregated education. The overlapping between the two sexes for both 14- and 15-year-olds in both schools is so great that mental-age groups regardless of sex would form a better basis of classification. It should be

pointed out, also, that there exists no better way of training boys and girls in the right attitude and conduct toward each other in both present and later life than to have them associate under right conditions as they grow up. To this end the school may contribute much if they are educated together, little if they are segregated.

In the opinion of the writer, it is unfortunate that many of the continuation schools of Massachusetts are so organized

TABLE XLVII
MENTAL-AGE RANGE IN REGULAR SCHOOL

Mental Age made by	Percentile Groups					
	25		50		75	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
Boys.....	13	5	15	..	16	6
Girls	13	1	14	8	14	11
Difference	4		4		7	

Mental Age made by	Percentile Groups					
	25		50		75	
	Yrs.	Mos.	Yrs.	Mos.	Yrs.	Mos.
Boys.....	13	10	15	6	17	1
Girls	13	6	14	11	16	4
Difference	4		7		9	

that the girls and boys never come in contact with each other in the classroom, at assemblies, on the school grounds, at social affairs, or in any way under the auspices of the school itself. While they are really a part of one organization, they are managed as separate and distinct units. Such a procedure might be justifiable where the individual has made a selection of his life-work and where the school is giving him definite vocational education. In the present instance, however, the schools are almost entirely of a prevocational grade, and it would seem that much of the work could be given to groups of boys and girls combined, allowing always for differ-

ences in interests, attitudes, and desires. In any event, it would seem that the mingling of boys and girls in all school activities of the classroom is possible and highly desirable.

In so far as the present evidence throws light upon junior and senior high-school organization, the same conclusion would be in order as that pointed out for the continuation school. While the evidence shows the boys, both 14- and 15-year-olds, to be superior to the girls by an average of 5 or 6 months, a general classification on the basis of mental age would give more homogeneous groups. The overlapping is too great to warrant segregation. This does not mean, however, that attention should not be paid to individual differences in interests, attitudes, life-aims, school motives, etc. If there is to be any segregation of the sexes for the purpose of education during these years, it must be justified on the latter basis rather than on that of intelligence.

CONCLUSION

Little need be said in conclusion. The evidence in this chapter has been presented because the question whether or not there is a difference in intelligence between boys and girls of the same chronological ages at any time during their development is highly controversial. Investigations in this field are still primitive. An answer to the question will be given, finally, only when measurements are made on the same individuals over a period of years, and when we are certain of the neutrality of the measuring instrument. The fact must not be lost sight of, however, that the median mental ability of both the boys and girls who left school to go to work was approximately 2 years and 6 months below that of those of the same sex who remained in school. Thus the public school in its eliminating process is no respecter of feminine courtesies, but deals with each impartially.

CHAPTER VIII

AN ANALYSIS OF VARIOUS REASONS FOR LEAVING SCHOOL

IN any discussion of the problem of elimination of pupils from school, one cause which stands out prominently is the economic status of the family. Some investigators state that there is only slight relationship between economic conditions in the home and the length of stay of pupils in school, while others believe that there is a fairly high correlation between the two. The latter belief confirms the popular vote on the question, and also has a very strong following among members of the teaching profession. The writer decided to see how far economic necessity ¹ was a factor of importance in the present study.

The method employed was to have a personal interview with each pupil and find out from him why he left school to go to work. These results were then checked by (1) teachers' reports of the regular-school work; (2) information in the hands of attendance officers and school nurses; (3) information gained by continuation-school teachers in their follow-up work; (4) special home visits by the writer and others in doubtful cases.

REASONS GIVEN BY PUPILS FOR LEAVING SCHOOL

The reasons for leaving, as reported by the pupils, grouped themselves around four factors. These were (1) economic; (2) being forced out by the school authorities for disciplinary

¹ There is no general agreement among investigators as to the meaning of this term. The writer considers that economic necessity exists only when the wage which the boy or girl earns is absolutely essential for the preservation of the family group as an independent organization.

reasons; (3) inability to do the work required in the regular school; (4) desire to go to work. The total number of cases examined was 263, and they were distributed as follows:

Reason No.	Boys	Girls	Total	Per Cent
1	2	13	15	6
2	8	1	9	4
3	72	62	134	50
4	50	55	105	40

Analysis of the Economic Reason

The replies of the 2 boys and 13 girls who gave number one, the economic reason, were carefully checked by visits to the homes and consultations with the parents. In every instance except one, that of a girl cited in Chapter II, it was the unanimous testimony that, had the children shown any desire to continue in school, they could have done so. All the parents realized the need of an education, but argued that it seemed better for the boys and girls to be on jobs doing things in which they were interested than to be driven to school to do things in which they had no interest. This is practical and sound applied psychology. The scores of these pupils on the test were distributed as follows:

Sex	Score	Mental Age	I. Q.	Grade last attended
F	140	16	110	I*
F	137	15-9	109	8
F	136	15-8	109	I
F	129	15-2	105	8
M	117	14-3	98	II
F	100	13	90	7
F	93	12-7	87	7
F	74	11-5	79	7
F	73	11-4	78	6
M	73	11-4	78	7
F	68	11-1	78	7
F	64	10-10	75	5
F	59	10-7	73	7
F	56	10-4	71	6
F	37	9-5	65	7

* The Roman numerals here and in the other tables following refer to the four high-school grades.

The second girl from the top, with a score of 137, mental age 15 years and 9 months, and I. Q. of 109, was the case referred to above as leaving for economic reasons. The evidence in all the other cases showed that the real reason was inability to do the work which the school demanded. The results of the tests, as given above, simply confirm this.

Analysis of the Disciplinary Reason

There were nine pupils — eight boys and one girl — who were forced out of school by the authorities for disciplinary reasons. The two brightest were for cigarette-smoking, the remainder for open disobedience to teachers. The scores of these on the test were distributed as follows:

Sex	Score	Mental Age	I. Q.	Grade last attended
M.....	190	20-2	139	High
M.....	182	19-6	134	High
F.....	164	18	124	7
M.....	132	15-4	106	8
M.....	108	13-8	94	8
M.....	75	11-5	79	8
M.....	57	10-5	72	7
M.....	56	10-4	71	5
M.....	55	10-3	71	6

The most striking fact about these is that on the basis of the I. Q. they may be divided roughly into two classes — those above normal and those below. The writer investigated these cases very carefully, and found that for the first four the difficulty arose from not being properly placed in the grades. The mental age shows that they could be doing work from one to three years beyond where they were actually located. The result was lack of interest, poor work, indifference, and, finally, open disobedience and expulsion.¹ The fun-

¹ Another good illustration of this is furnished by the case of a boy who was in first-year high school and about to be dropped for a combination of poor work and disobedience. His score on this test was 161, which gives a mental age of 17 years and 9 months and an I. Q. of 122. A change of program to conform more nearly to the boy's possibilities has remedied the condition and saved another from the educational scrap-heap.

damental trouble in the other five cases was clearly a lack of mental ability to do the work of the grade. Each was beyond where his mental age showed that he ought to be, and, in all except one instance, beyond the highest point at which he would ever do school work as predicted by the I. Q. In each case the result was as stated above: the boy paid the penalty, through no fault of his.

Analysis of Lack of Ability as a Reason for Leaving

A distribution of the scores, mental ages, I. Q.'s, grade last attended, and grade they should have attended according to their mental ages is given in Table XLVIII for all boys leaving school to go to work because of inability to do what is required in the regular school. By making a distribution of the chronological ages of all pupils in grade 1, it was found that 75 per cent were between 6 and 7 years, the other 25 per cent being older. Consequently it is assumed that a mental age of 6 up to 7 years is normal for this grade, from 7 up to 8 for grade 2, etc.¹ A pupil, then, with a mental age of 10 years and 4 months ought to have been in the 5th grade at the time of leaving, if he were placed correctly; another with a mental age of 12 years and 7 months should have been in the 7th grade, and so on. On this basis any pupil with a 14-year mental age ought to be in first-year high school.

The first point to be noted is that of the 50 boys with a mental age up to 14 years, or within the period of the elementary school, 11 were graded rightly according to mental age, 8 were retarded one year or more, and 31 were from one to three years accelerated, or beyond where they ought to be. This means that most of these were attempting work much beyond their mental ability; and there is every reason to be-

¹ Professor Terman in the *Journal of Educational Research*, vol. 1, p. 27, proposes, for the country at large, $6\frac{1}{2}$ to $7\frac{1}{2}$ for grade 1, $7\frac{1}{2}$ to $8\frac{1}{2}$ for grade 2, etc. These figures assume an entering age of $6\frac{1}{2}$ years and would be too high for the case at hand.

TABLE XLVIII

DISTRIBUTION OF SCORES, MENTAL AGES, AND I. Q.'s OF
BOYS LEAVING SCHOOL BECAUSE OF INABILITY TO DO THE RE-
QUIRED WORK

Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended	Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended
190	20-2	139	I	IV	94	12-7	87	7	7
171	18-7	...	I	IV	90	12-4	85	7	7
165	18-1	124	I	IV	90	12-4	85	7	7
152	17	117	I	IV	89	12-4	85	8	7
151	16-11	117	8	IV	86	12-2	84	8	7
141	161	111	I	III	85	12-1	83	7	7
136	15-8	108	I	II	79	11-8	80	6	6
132	15-4	106	8	II	78	11-8	80	8	6
132	15-4	106	I	II	78	11-8	80	7	6
126	14-11	103	7	I	76	11-8	80	8	6
123	14-8	101	8	I	76	11-6	79	7	6
122	14-8	101	8	I	76	11-6	79	8	6
121	14-7	101	7	I	75	11-5	79	7	6
121	14-7	101	II	I	74	11-4	78	7	6
121	14-7	101	6	I	74	11-4	78	8	6
120	14-6	100	8	I	71	11-2	77	7	6
119	14-5	99	7	I	70	11-2	77	8	6
118	14-4	99	8	I	66	10-11	75	6	5
117	14-3	98	8	I	65	10-11	75	6	5
114	14	97	8	I	63	10-10	75	8	5
113	14	97	7	I	63	10-10	75	6	5
113	14	97	7	I	62	10-9	74	6	5
112	13-11	96	I	8	61	10-8	74	7	5
111	13-10	95	6	8	59	10-7	73	8	5
109	13-9	95	8	8	58	10-6	72	6	5
108	13-7	94	7	8	58	10-6	72	7	5
105	13-5	93	8	8	57	10-5	72	6	5
104	13-4	97	8	8	57	10-5	72	5	5
103	13-3	92	7	8	56	10-4	71	6	5
103	13-3	92	7	8	55	10-6	71	5	5
101	13-2	91	7	8	54	10-4	71	6	5
100	13-1	91	7	8	53	10-2	70	5	5
98	12-11	89	6	7	49	10	69	7	4
98	12-11	89	8	7	48	9-11	68	7	4
95	12-8	87	6	7	46	9-10	68	6	4
95	12-8	87	8	7	26	8-4	57	4	3

lieve that the cause of leaving, as given by the pupils, is the correct one.

Turning now to the 22 cases of high school ability, we find that none are correctly placed—one is accelerated and 21 are from one to four years retarded. These pupils were all normal

TABLE XLIX

DISTRIBUTION OF SCORES, MENTAL AGES, AND I. Q.'S OF
GIRLS LEAVING SCHOOL BECAUSE OF INABILITY TO DO THE RE-
QUIRED WORK

Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended	Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended
147	16-7	...	I	IV	83	11-11	82	7	6
138	15-9	109	7	III	82	11-10	82	8	6
136	15-8	109	I	III	82	11-10	82	8	6
131	15-3	105	8	III	82	11-10	82	7	6
129	15-1	104	8	III	79	11-9	81	I	6
124	14-9	102	8	III	79	11-9	81	6	6
123	14-9	102	II	II	78	11-8	80	8	6
123	14-9	102	I	I	77	11-7	80	I	6
122	14-8	101	7	I	76	11-6	79	8	6
111	13-10	95	8	8	76	11-6	79	7	6
111	13-10	95	8	8	76	11-5	79	8	6
109	13-9	95	8	8	73	11-4	78	7	6
109	13-9	95	7	8	73	11-4	78	6	6
104	13-5	93	6	8	72	11-3	78	8	6
98	12-11	89	7	7	70	11-2	77	6	6
97	12-10	89	8	7	62	10-9	74	7	5
95	12-8	87	7	7	59	10-7	73	4	5
94	12-7	87	7	7	57	10-5	72	8	5
93	12-7	87	8	7	55	10-5	72	6	5
93	12-7	87	7	7	54	10-4	71	6	5
90	12-4	85	7	7	52	10-3	71	7	5
90	12-4	85	7	7	51	10-2	70	6	5
88	12-3	84	8	7	50	10-2	70	7	5
88	12-3	84	7	7	49	10	69	7	5
87	12-3	84	7	7	40	9-7	66	6	4
87	12-3	84	I	7	38	9-6	66	6	4
86	12-2	84	6	7	35	9-3	64	8	4
86	12-2	84	6	7	35	9-3	64	7	4
85	12-1	83	7	7	28	8-6	59	4	3
85	12-1	83	7	7	27	8-5	58	4	3
84	12	83	I	6	27	8-5	58	6	3

or above in mental ability, yet their school records showed, with very few exceptions, that they were not passing, and their own testimony and that of teachers was that they could not do the work.

Table XLIX gives the same information for girls who left school because of inability to do the required work. Of the 53 with a mental age up to 14, 16 were correctly placed in the grades, 5 were retarded, and 32 were accelerated. These proportions do not vary greatly from those given for the boys.

TABLE L

DISTRIBUTION OF SCORES, MENTAL AGES, AND I. Q.'s OF BOYS
LEAVING SCHOOL BECAUSE OF DESIRE TO WORK

Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended	Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended
159	17-7	...	7	IV	100	13-1	90	8	8
158	17-6	...	I	IV	100	13-1	90	I	8
153	17-1	...	I	IV	99	13	90	I	8
151	16-11	...	II	III	98	12-11	89	I	7
146	16-6	...	8	III	95	12-11	89	8	7
145	16-5	...	8	III	95	12-8	87	7	7
143	16-3	...	I	III	91	12-5	86	7	7
134	15-6	107	I	II	90	12-4	85	7	7
120	14-6	100	8	I	89	12-4	85	6	7
119	14-5	99	I	I	88	12-3	84	6	7
118	14-4	99	8	I	86	12-2	84	6	7
117	14-3	98	8	I	86	12-2	84	8	7
116	14-2	98	8	I	84	12	83	7	7
116	14-2	98	8	I	83	11-11	82	8	6
116	14-2	98	8	I	78	11-8	80	7	6
115	14-1	97	8	I	74	11-4	78	6	6
114	14	97	8	I	74	11-4	78	8	6
114	14	97	7	I	71	11-2	77	6	6
111	13-10	96	8	8	70	11-2	77	6	6
108	13-8	95	I	8	63	10-10	75	6	5
107	13-7	94	8	8	60	10-7	73	7	5
104	13-5	93	8	8	59	10-7	53	7	5
102	13-3	91	7	8	59	10-7	53	7	5
101	13-2	91	5	8	48	10	69	7	5
101	13-2	91	7	8	33	9	62	7	4

TABLE LI

DISTRIBUTION OF SCORES, MENTAL AGES, AND I. Q.'s OF GIRLS
LEAVING SCHOOL BECAUSE OF DESIRE TO WORK

Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended	Score	M. A.	I. Q.	Grade last attended	Grade ought to have attended
154	17-2	...	I	IV	88	12-3	84	6	7
142	16-2	...	7	III	87	12-3	84	I	7
137	15-9	109	I	II	84	12	83	I	7
137	15-9	109	7	II	82	11-10	82	7	6
134	15-6	107	I	II	77	11-7	80	8	6
133	15-5	106	I	II	77	11-7	80	6	6
132	15-4	106	I	II	77	11-7	80	7	6
132	15-4	106	I	II	77	11-7	80	6	6
129	15-2	105	I	II	73	11-4	78	4	6
124	14-9	102	I	I	71	11-2	77	7	6
119	14-5	99	II	I	70	11-2	77	8	6
119	14-5	99	I	I	69	11-1	76	7	6
119	14-5	99	I	I	66	10-11	75	8	5
112	13-11	96	6	8	63	10-10	75	6	5
109	13-9	95	7	8	63	10-10	75	8	5
107	13-7	95	8	8	63	10-10	75	7	5
105	13-7	94	6	8	62	10-9	74	7	5
101	13-2	91	I	8	62	10-9	74	7	5
101	13-2	91	5	8	62	10-9	74	8	5
101	13-2	91	7	8	62	10-9	74	7	5
101	13-2	91	8	8	58	10-6	72	6	5
99	13	90	6	8	55	10-5	72	7	5
99	13	90	7	8	51	10-2	70	6	5
95	12-8	87	8	7	51	10-2	70	7	5
94	12-7	87	7	7	51	10-2	70	6	5
92	12-6	86	7	7	46	9-11	68	6	4
91	12-5	86	7	7	46	9-11	68	7	4
90	12-4	85	7	7					

Of the 9 cases with mental ages 14 or beyond, or of high-school ability, 2 were correctly graded and the others were retarded.

Analysis of Genuine Desire to Work as a Reason for Leaving

The fourth reason assigned by pupils for leaving school was a genuine desire to go to work. Table L gives a distribution of the scores, mental ages, I. Q.'s, grades last attended, and those they should have attended, for the 50 boys giving this

as the reason why they left. Of the 32 with an elementary-school mental age, 11 were rightly placed, 6 were retarded, and 15 were from one to three years accelerated. The 18 with high-school ability were correctly placed in 1 case, and the other 17 were retarded.

Table LI gives the same distribution for girls offering this as a reason for leaving. Here there is a total of 55, with 42 having an elementary-school mental age. Of these, 8 were correctly placed, 9 were retarded, and 25 accelerated. There were 13 who had high-school mental ability. Three of these were well graded, one was accelerated, and 9 were retarded.

RETARDATION AND ACCELERATION IN ELEMENTARY AND HIGH SCHOOLS

A comparative summary of the information just given for those who left school because of (1) inability to do what was required, and (2) genuine desire to work is given in Table LII. Those pupils having a mental age up to 14 are listed under elementary school, those above are in the high-school group. It was stated at the beginning of this chapter that in determining the normal mental age for grade one, it was found that the ages 6 to 7 included all except the upper 25 per cent of the cases. For each succeeding year the assumption is made that the distribution of cases will be approximately the same as grade one. It will be seen, then, that at the very beginning of the school system no pupils are accelerated and 25 per cent are retarded.

Let us now look at our elementary-school group. The first point to be noted is that 30 per cent are correctly placed, 20 per cent are retarded, and 50 per cent accelerated. In other words 8 per cent less than the expected number are retarded and 45 per cent less than the expected number are normal, while exactly half are accelerated. It should be noticed also that group (1) has 64 per cent accelerated as against 30 per cent for group (2).

TABLE LII

COMPARATIVE SUMMARY OF THE DATA GIVEN IN TABLES L AND LI

<i>Elementary School</i>											
<i>(1) Inability to do the work</i>					<i>(2) Desire to go to work</i>						
	Boys	Girls	Total	Per Cent	Boys	Girls	Total	Per Cent	Grand Total	Per Cent	
Normal	11	15	26	25	11	2	13	26	39	30	
Retarded	7	4	11	11	6	16	22	44	33	20	
Accelerated	32	34	66	64	15	..	15	30	81	50	
Total	50	53	103	..	32	18	50	..	153	..	
<i>High School</i>											
	Boys	Girls	Total	Per Cent	Boys	Girls	Total	Per Cent	Grand Total	Per Cent	
Normal .....	..	..	..	..	2	3	5	16	5	8	
Retarded	21	9	30	97	16	9	25	80	55	89	
Accelerated	1	..	1	3	..	1	1	4	2	3	
Total	22	9	31	..	18	13	31	..	62	..	

In the case of those with high-school mental age only 8 per cent are correctly placed, 3 per cent are accelerated, and 89 per cent are retarded. This amount of retardation is 64 per cent greater than would be expected, and this figure represents, roughly, the degree of inefficiency of the school system in respect to those pupils over a period of 8 to 10 years. It should be noted, also, that the amount of retardation is much heavier among those in group (1) than in group (2), the figures being 97 and 80 per cent respectively.

The inevitable conclusion from these figures is that the elementary school tends to push pupils ahead faster than their mental age warrants, and that the high school tends to do just the opposite. This condition is admitted by both elementary- and high-school principals. In the case of the former, after a pupil has repeated one or more grades, it is the practice to push him along, for (1) no teacher wants to keep him two years; (2) it is argued that he should be placed with children very close to his own age, on moral grounds; (3) it is known that he will probably drop out to go to work as soon

as he is 14 years old, and he must have gone through the 6th grade in order to do this. With the latter everything is on a unit basis, with so much prescribed for each year, while little or no opportunity is given bright pupils to do this work in less than the four years' time.

Further evidence of this leveling tendency on the part of school systems is shown by the fact that the majority of 14-year-olds leave school from the 7th grade and of 15-year-olds from the 8th grade. With the former, this is as soon as possible after covering the legal requirement. With the latter, this means an elementary-school diploma, an article of some commercial value. Under these conditions we should naturally expect a fairly high correlation between test scores and school grades last attended. This is true, the Pearson Coefficients being:

Age	Boys	Girls
14 years .....	.52	.56
15 years .....	.60	.54

It was stated at the beginning of this chapter that the reasons given by pupils for leaving regular school were very carefully checked up by all other available sources. With a very few exceptions, all the 263 cases were doing poor work in the regular school at the time of leaving, and the reports of teachers were to the effect that they were glad to have them drop out. Cumulative school-record cards for many were not available, but, on the basis of those at hand, it is safe to estimate that at least 50 per cent of the total number had repeated one or more grades. To what extent this was due to moving from one city to another, sickness, and other causes, there are no data to determine.

In the case of nearly all of those who stated that they left school because they could not do the work of the grade, it was easy to see that this might be so after looking up their records and securing the reports of the teachers. It now

seemed probable also that, in the case of many of those who stated that they had a genuine desire to work, lack of ability might be the underlying cause. What the writer could not at that time interpret was the fact that even the brightest pupils, who had sufficient mental ability to do work far beyond where they were graded, should be rated by teachers as failures who could not possibly make their promotions in elementary school or pass their subjects in the high school.

Further conferences were now held with pupils and parents. These revealed the fact that of the 62 pupils listed in Table LII as having high-school mental ability, most of whom had actually attended high school, each was dissatisfied with the school work because he could not see where it led to, what relation it had to life in general or to earning a living in particular. None of them were urged by their parents to go to work, and they were not anxious to do so themselves; but weighing the school *versus* the job, the latter seemed to be the lesser of the two evils, so that course was decided upon. When one adds to these statements of parents and pupils the fact, as pointed out above, that 89 per cent of them were placed in school below the point where their mental ability showed that they ought to be, one can easily see how the school drove them out. It is interesting to note that all of these were excellent students in continuation school. Many of them, both boys and girls, when asked by the writer why they were doing so well, after their experiences in regular school, stated that for the first time in their lives they saw the connection between the school and everyday life. The job had succeeded where the school had failed. The writer saw that lack of intelligence was the underlying factor which caused these boys and girls to leave school, but the lack was not on their part.

Again referring to Table LII, of the 153 listed as having elementary-school mental ability, it was very evident there

were two causes, one of major and the other of minor importance. The first was inability to do the work of the grade. In many instances, especially where there were other children in the family, the parent would state that the others all progressed well in school and passed their work without any trouble, but this particular one never could do it; therefore they thought he had better be at work. It was very evident that this fact was a source of much regret on the part of parents who had looked forward to giving their children a better education than their own, so that the children might enter a vocation better than that of the father. The second cause, found in approximately 5 per cent of the cases was the grammar-school diploma. The attitude of both pupils and parents was that it had been a long, hard pull to get that far, and now that they had something to show for it, why go any farther. In the cases of all who did not leave immediately after the completion of the 6th grade, there seemed to be an appreciation of the commercial value of this diploma, especially among the boys. This is probably one fact which accounts for the slightly higher correlation between test scores and school grades of the 15-year-old boys, as given above.

CONCLUSION

It would seem that the evidence presented leads to three conclusions: (1) information received from children as to why they leave school to go to work is unreliable, and cannot be accepted without careful checking; (2) the two usual reasons, that is, the economic one and genuine desire to go to work, are of little significance; (3) inability to do the work of the regular school is by far the most important factor.

CHAPTER IX

INVESTIGATIONS BEARING ON THE RELATION OF INTELLIGENCE TO SCHOOL ELIMINATION

It was stated at the very outset that this investigation was undertaken because it was a virgin field in so far as the writer could find. The specific problem had not before been studied; but since the investigation was begun, one or two other studies have been reported.¹ It is the purpose of the writer, in this chapter, to analyze such literature as bears upon the present topic, to see whether or not the findings in other parts of the country agree with those just presented for Massachusetts.

Beginning with Thorndike² in 1907, attempts have been made to discover the reasons for school elimination by such studies as those of Ayres,³ Dynes,⁴ Holley,⁵ Van Denburg,⁶ and many others. Some of these dealt with the whole school system, others with only the elementary schools, and still others with the high schools. In every case they included all pupils leaving, regardless of whether or not they went to work. Some of the factors involved were retardation, sickness, financial condition, size of the family, nationality of the

¹ It is interesting to note, as was pointed out in Chapter I, that Mr. Cyril Burt, in his recent important contribution on the results of tests in the London schools, proposes a study of the continuation-school pupils. *Mental and Scholastic Tests*, p. 244 (1921).

² Thorndike, E. L., "The Elimination of Pupils from School"; *Bureau of Education Bulletin*, 1907, No. 4.

³ Ayres, L. P., *Laggards in our Schools*. New York, 1909.

⁴ Dynes, J. J., "Relation of Retardation to Elimination from High School"; *School Review*, vol. 22, pp. 396-406.

⁵ Holley, C. E., "The Relationship between Persistence in School and Home Conditions"; *Fifteenth Yearbook of the National Society for the Study of Education*, part II.

⁶ Van Denburg, J. K., *Causes of Elimination of Students in Public Secondary Schools of New York City*. New York, 1911.

father, occupation of the father, education of the parents, and early intentions of pupils. In none of these, however, was the question of intelligence discussed or even intimated.

The first study of the relationship between school elimination and ability was made by Dearborn¹ in 1909, in two city high schools in Wisconsin, using teachers' marks as a basis. He found that (1) fully one third of the pupils who reached high school had been inferior pupils in the grades; (2) fully one third who dropped out of high school had ranked in the upper half of their class in high school; (3) scholarship had a very definite relation to elimination from the university; (4) the subject of English influenced elimination more than mathematics. This study was extended by Johnson² to include 16 high schools. He found that (1) the weight of elimination was from the inferior groups; (2) this was truer of large city high schools than smaller township high schools; (3) it was more pronounced among boys than girls. While the evidence produced in these two studies was very conclusive from the point of view of this investigation, it is open to two objections: (1) the unreliability of teachers' marks as a basis for determining ability; and (2) lack of figures to show what proportion of those who left school went to work.

In 1919 Proctor,³ in a number of California high schools, investigated the school records of 107 pupils who were tested by the Stanford-Binet in 1916-1917, and 955 who were given Army Alpha in 1917-1918. He found that 21 of the former and 138 of the latter had left school to go to work. The I. Q.'s of these were distributed as follows:⁴

¹ Dearborn, W. F., "Qualitative Elimination from School"; *The Elementary School Teacher*, September, 1909.

² Johnson, George R., "Qualitative Elimination from High Schools"; *School Review*, December, 1910.

³ Proctor, W. W., "Psychological Tests as a Means of Measuring the Probable School Success of High School Pupils"; *Journal of Educational Research*, vol. 1, pp. 258-270.

⁴ *Idem, op. cit.* Compiled from data given on pp. 265 and 267.

I. Q.'s	Stanford-Binet Cases	Army Alpha Cases
79 or lower	1	8
80-89	5	25
90-99	9	53
100-109	6	35
110-119 .....	..	9
120-129 .....	..	7
130 or over .....	..	1
Total	21	138
Median I. Q.	94	96

Proctor concludes that "the high school principal can be reasonably sure that 50 per cent of those who test below normal will be eliminated within the first two years; that 25 per cent additional of the subnormal group will have been transferred to other high schools because of failure in their work; and that a negligible number will ever graduate. . . . Lack of mental ability was the most potent cause of failure."¹

While all the above-mentioned studies bear directly on the general field of elimination, the specific problem of the relationship between intelligence and leaving school to go to work is still untouched, except in so far as the data from Proctor shed light upon it. While this is significant as showing a general tendency, the number of cases involved and the field covered are both too limited to warrant specific conclusions.

A very interesting and complete study, which deals with the intelligence of continuation-school children, is that by Dr. Ruth Swan Clark in the *Survey* for January 8, 1921. All the pupils who attended the ten sessions of one of the New York City continuation schools during one week, a total of 768, were given the Otis intelligence test. They were 15 and 16 years of age and had completed the requirements of the 6th grade in regular school, as required by law. They attended continuation school four hours per week.

¹ Proctor, W. W., *op. cit.*, pp. 266-268.

The range of mental ability was found to be from that of an eight-year-old up to a very superior adult; 90.2 per cent of the group, however, had intelligence below that of the normal child of the same age. Although the chronological age averaged 15 years and 8 months, the mental age showed an average of 11 years and 1 month. The median I. Q. was 69.5, about 30 points below normal.

In the present investigation, based upon 1200 continuation-school children, the median mental age for 14-year-olds was found to be 12 years and 4 months; for 15-year-olds 12 years and 7 months. The I. Q.'s of the median child for 14- and 15-year-olds were 85 and 87 respectively. The difference in mental age of 1 year and 6 months is so great as to warrant some discussion.

The most obvious explanation lies in the selection of cases. Dr. Clark states that the pupils examined included all those who attended this particular continuation school for one week. As there are a number of such schools in New York City and pupils in the others have not yet been examined, there is no way of determining what particular selection of the total group these 768 cases happened to be.

It is reasonable to assume, however, that the pupils enrolled in the New York continuation schools are an average group, with no higher or lower intelligence than that of pupils in other continuation schools where there is no one particular selective factor. Indeed, with the highly cosmopolitan population and great diversification of industries, one would naturally expect that, if there was selection at all, it would be toward drawing into industry persons with slightly higher than the average intelligence, as was found in our results of Cases II and IV and pointed out in Chapter VI above. It would seem, then, that theoretically the cases reported must represent a group poorer than the average of the entire continuation-school enrollment.

The writer believes, however, that a more important factor than the selection of cases, in causing the low results, was the type of intelligence test selected. The Otis test is heavily weighted on the language side. Most of the children examined were of foreign racial ancestry, to whom the English language presented real difficulties even though they had technically completed the requirements of graduation from the 6th grade. It would seem, then, that for this group such a test would not give a fair measure of intelligence, but would tend to weight the distribution toward the lower end. This is exactly what happens, the distribution of I. Q.'s as given by Dr. Clark being skewed heavily toward the negative side.¹

Another point to be noted is that the mental ages derived from any intelligence examination are affected materially by the reliability of the standards set for the different scores. Dr. Clark, at the beginning of her article, apparently justifies the selection of this particular test on the ground that it had been standardized by the testing of 11,000 cases and correlated with the results of Army Alpha.² The assumption is that the standards must be right if the number of cases is large enough. The writer feels, however, that the fundamental criterion for standardizing a test is not quantity of cases, but right selection. It is very possible to build up numbers by taking the results sent in by schools in all parts of the country, where there is no check on the giving or the composition of the groups tested other than the grade designation. The real defect here is that there is no way of telling whether or not the results sent in are representative of the total group of pupils in the same grade or age in the entire city. The use of such results, in the opinion of the writer, means a poorly selected group and, therefore, unreliable standards. A method less open to question, however, would

¹ Clark, Ruth Swan, *op. cit.*, p. 542.

² *Ibid.*, p. 541.

be to select several representative communities and test every pupil in the school system. This certainly would give an unselected group, and by comparing results in the different places, reliable mental-age standards can be secured, although the number of cases may not be large. The examination used by the writer in the present investigation was standardized in this way, and the reliability of the results must be considered high, because in Cases I and III, where the entire number of 14-to-16-year-olds in school was tested, the median scores varied less than two points from the published standards for these ages, as was pointed out in Chapter VI.

As the I. Q. is the ratio of the mental to the chronological age, it would naturally follow that the objections to the test used by Dr. Clark, as pointed out above, would affect the I. Q. results. It should be noted also that the median adult mental age was assumed by Dr. Clark to be 16 years, while in the present investigation it is taken as 14 years and 6 months.¹ With a median mental age of 11 years and 1 month as reported by her, the I. Q. of the median child on the 16-year adult mental age assumption would be 69, while on the 14 years and 6 months basis it would be 76, or 7 points higher. This would make the results found in this investigation 11 points higher than those reported by her.

Further evidence tending to confirm the results of this investigation has recently been produced by Dr. George S. Counts of the Department of Education in Yale University. In making a study of the selective character of secondary education, he had occasion to give the Chapman-Wells Junior-Senior High-School Classification Test to 910 first-year high-school pupils, 181 evening-high-school pupils, 112 first-year trade-school pupils, and 421 compulsory continuation-school

¹ A detailed discussion of the reasons for this hypothesis is given in Chapter VI.

pupils, all of whom were in the city of Bridgeport, Connecticut. The median scores for each of the four groups were as follows: first-year high school, 89.7; evening high school, 78.1; first-year trade school, 62; continuation school, 40.9.¹ The outstanding fact is that the compulsory continuation-school group, composed of those who had left school to go to work, had a median score 48.8 points below that of the first-year high-school group, and 39 points below the average median score of the other three groups. The distribution of scores shows that approximately 5 per cent of the continuation-school group overlapped the median of the high-school group. The conclusion is self-evident.

Superintendent O. H. Plenzke of Menasha, Wisconsin, has been kind enough to allow the writer to make use of some data which he gathered in Wisconsin.² He tested all the continuation-school pupils, a total of 190, in two cities of the state with the Terman Group Test of Mental Ability. The median chronological age of the combined group was 16 years and 7 months. This is higher than that found by the writer, as the Massachusetts continuation-school ages are 14 to 16, pupils being discharged when they reach their sixteenth birthday. The median-mental age for the total group was 12 years and 9 months. This is just 3 months higher than that for the combined 14- and 15-year-olds in the present investigation. Assuming 16 years as the median adult mental age, as was done by Superintendent Plenzke, this would give a median I. Q. of 80. Assuming 14 years and 6 months as the median adult mental age, as was done by the writer,³ this would give a median I. Q. of 88. In other words, the median I. Q. of this Wisconsin continuation-school group is just 2 points above the 86 found for the combined 14- and 15-year-

¹ Counts, G. S., *op. cit.*, p. 125.

² Contained in a personal letter to the writer from Superintendent Plenzke, under date of April 21, 1923.

³ A detailed statement of reasons for this assumption is given in Chapter VI.

olds in the Massachusetts continuation schools. Apparently further comment is unnecessary.

One of the most comprehensive recent investigations in this field was made during the past year by Mr. George P. Young, a graduate student at the University of Colorado. He gave the Dearborn Group Intelligence Test, Series II, to all of the pupils, a total of 175, who were attending the Denver Opportunity School because of the fact that they held working permits. Mr. Young found the median chronological age of this group to be 15 years and 6 months.¹ The median mental age was 12 years and 4 months, which gives a median I. Q. of 86. Of the total group, 73.43 per cent had an I. Q. of less than 100. This is 23.43 per cent more than one would expect to find in a normal distribution. Again, 59.43 per cent had an I. Q. of less than 90, while in a normal distribution one would expect 20 or 25 per cent.

In the spring preceding Mr. Young's investigation, the Terman Group Test of Mental Ability had been given to all the pupils in the 9th grade of the regular-school system. The median chronological age of this group was 15 years and 4 months, while the median mental age was 14 years and 6 months. A comparison of the two cases shows that, while the median chronological age of the Opportunity School group was 2 months higher than that of the 9th grade group, the median mental age was 2 years and 2 months lower. The median mental age of the Opportunity School group, 12 years and 4 months, is exactly the same as that found by the writer in the present investigation for the 14-year-old continuation pupils, while the median mental age of the 9th grade group, 14 years and 6 months, is 4 months less than that found for the 14-year-old regular-school group. A comparison of I. Q.'s shows that 86, the median I. Q. of the Opportunity

¹ From an unpublished master's thesis on file in the library of the University of Colorado.

School group, is 1 point above that of the 14-year-olds in the Massachusetts continuation schools, while the 100 of the 9th grade group is 2 points less than that found for the regular-school group.

In conclusion, it seems reasonable to infer that the results of other investigations, in other parts of the country, in so far as they bear upon the topic, support the results found in this investigation in Massachusetts. The close agreement relative to median mental age and intelligence quotients of continuation-school pupils is remarkable when one considers that different intelligence tests were used, different racial groups were represented, and the industrial opportunities were by no means uniform. Had other factors been involved to any extent, greater variations would have been found.

CHAPTER X

CONCLUSIONS

IN the preceding sections of this report, little was presented except a bare statement of the aims of the investigation and the results revealed. In the present chapter we shall present some conclusions which may be drawn from the foregoing data, and point out briefly their educational significance.

CONTINUATION-SCHOOL PUPILS A SELECTED GROUP

The first important fact that stands out very prominently in our results is that continuation-school pupils are a selected group of young people. While their scores overlapped those of pupils of the same age who have remained in school, their median score was 35 points below that of the latter group. In so far as the test used in this investigation can be relied upon to measure intelligence,¹ continuation-school pupils show a lower median intelligence than those of the same age groups who are in regular school. Their median mental age is not only 2 years and 6 months below the latter, but also 1 year and 11 months, for 14-year-olds, and 1 year and 5 months, for 15-year-olds, below the median mental age for the combined group of continuation- and regular-school pupils of their respective years. The median mental age of 11 years and 1 month for the continuation pupils tested in New York City by Dr. Ruth Clark is 3 years and 9 months below that for the same age groups in regular schools in Massachusetts. The results found by Superintendent Plenzke in Wisconsin show a median mental age of 2 years and 3 months below those

¹ A discussion of the reliability of the test used for this purpose is given in Chapter I.

who remain in school. Mr. George Young, in Denver, found the median mental age of his group to be 12 years and 4 months, or 2 years and 8 months below the regular-school pupils tested for this study, and 2 years and 2 months below the 9th grade group throughout that city.

It is very apparent that the median intelligence of continuation-school pupils is about 2 years and 6 months below that of pupils of the same age who remain in regular school. Is this a significant difference? If we consider that the median adult mental age is 14 years and 6 months, and that the normal person reaches this point in the same number of years, then this represents a retardation of 17.2 per cent. If we assume, however, that the normal child enters grade one with a 6-year mental age, the remainder would be developed during 8 years and 6 months of school life. On that basis 2 years and 6 months would mean a retardation of 29.4 per cent. It would seem that this school difference of nearly one third is very significant.

The evidence showed also that there was much overlapping of the distributions of the continuation- and regular-school groups. There were pupils in regular school who scored as low as those in continuation school, although not as many. Of 14-year-olds who scored below 60, there were 16 per cent in continuation and 1.5 per cent in regular school, while for 15-year-olds the figures were 17.5 and 1.5 per cent. Why is it that some pupils of low intelligence go to work, while others equally low remain in school? The primary answer is that those pupils who are in school cannot secure positions and therefore cannot leave. The writer believes that there are thousands of such pupils who are being held in the schools of Massachusetts to-day, solely because the business depression offers them little opportunity to leave. In the same way the writer feels that the enormous increase in the number of 14-to-16-year-olds at work during the war, as was pointed out in

Chapter I, was not due to a desire on the part of industries to secure cheap help, as some people argue, but to the fact that these boys and girls had never before found an opportunity to leave. Had the public-school system been meeting the needs of these children, they would have remained. It is the best possible evidence of the inefficiency of public education as at present organized. There are other factors which may apply to individual cases. Some have not completed the necessary educational requirements; others are held in school by their parents for social reasons; a few are able to secure fairly good grades from teachers by artificial means; and still others are of that neutral disposition which will suffer much in a known field before attempting the unknown.

SCHOOL IS NOT MAKING PROVISION FOR ITS BRIGHTEST GROUP

A second point which stands out very clearly is that the school system is making little attempt to locate and train that small group of its brightest members. There were a few pupils in continuation school who scored as high as the best of the regular school group. Of the 14-year-olds in continuation school, one per cent scored above 150, while the figure for the regular school group was 18 per cent. For 15-year-olds the percentages were 4.5 and 22. It was pointed out in Chapter VIII that these bright pupils were expelled from school as disciplinary cases, or left because of inability to do the regular-school work. It was the unanimous opinion of teachers and principals that these pupils could not do the school work and that they were better off in jobs. All the evidence showed that these statements were made without any attempt to make a careful study of the facts and reach a just conclusion. A similar condition was found by Mr. Young in the Denver study.¹

¹ Young, G. P., *op. cit.*, p. 23.

While it is true that a very large proportion of continuation-school pupils did lack ability to do the work of the regular school, this does not hold for a small but very intelligent number. Here, the underlying cause was not *inability*, but *unwillingness* to do the work; yet teachers and principals could see no distinction between the two groups. If unwillingness to submit to maladjustments by a school system, organized theoretically to give everyone an equal educational opportunity, is an indication of lack of intelligence, then every continuation-school pupil must be much below the average in this respect. If unwillingness to submit to such maladjustment shows a degree of intelligence beyond the average, — as some people argue, — then we need either to revise our idea of intelligence and its methods of measurement or else give intelligence tests to those officials who are in charge of public education. The story is told of a girl who had been in regular school seven years and was only in the fourth grade. Her teacher felt sure that she was feeble-minded and sent her to a psychologist for examination. The usual questions were asked and tests applied; after which the examiner concluded that the girl ought to be committed to an institution. At this point the girl said to the psychologist:

“You have had me do many things and have asked me many questions, some of which I have answered correctly and some of which I have not. I know that the result will determine whether I remain in school here at home or am sent away. Before you make your final decision would you mind allowing me to ask you a question?”

“Certainly not,” answered the examiner, “what is it?”

“Can you tell me what people call a little black cat in Canada?” she asked.

The psychologist thought for a long time, during which he recalled all of his knowledge of Latin and French which

might bear upon the problem; then he looked through a large number of big books and finally answered:

"No, I cannot. What do they call a little black cat in Canada?"

"Just a *kitten*," she replied.

Apparently there were some factors in intelligence which the psychologist overlooked in making his decision. In the same way, teachers and principals fail to distinguish between those who leave school because of a real lack of ability to do the work and those who have better than average ability but will not remain because of the traditional, impractical, and useless materials which they are required to study. Every school system, not later than the beginning of the seventh year, should have in operation a definite plan for selling its educational goods to its customers — the pupils. When these goods are so worn out and threadbare as to be rejected by the customers, then new ones should be purchased immediately and the old ones consigned to the scrap heap. Some of the merchandise that our junior and senior high schools have in stock at the present time is readily purchased by certain classes of students, even though it is badly shop-worn. Other groups of pupils want some real value for their money. They want fresh, clean, newly made merchandise, embodying the latest designs in style, cut, and fit. They want this in spite of the fact that the salesman may tell them the machine-made goods are not strictly all wool, while the hand-made, threadbare kind can be guaranteed. A refusal to sell the modern-made merchandise and insistence upon the purchase of the old-style kind sends these brighter pupils out of the store to do their shopping in some other place. An attempt to apply, in the school business, some of the principles which have been found successful in other businesses and which must be practised to avoid bankruptcy would hold many of these bright pupils as regular educational customers in the future.

SCHOOL SYSTEM A COMMON MOULD

Another outstanding fact is that the school system is attempting to put everyone through a common mould. The evidence given in Chapter VIII showed that, of all pupils who left the elementary school, 50 per cent were accelerated, or beyond a point where they could do school work as determined by their mental age, while 20 per cent were retarded, and only 30 per cent were normally placed. Of those pupils who left the high school 89 per cent were retarded, 3 per cent were accelerated, and 8 per cent normally located. The unmistakable tendency of the elementary school seems to be to push ahead these slow pupils, while that of the high school is to retard the bright ones. This can be explained on various grounds. *First*, the work is designed to fit the average child. A child who has mental ability below the average cannot do it. He is not promoted. The next year he does no better, and the teacher brands him as a hopeless case. She knows that he will probably leave school as soon as the law will allow him to do so; that he must be exposed, at least, to the work of so many grades; therefore she concludes it is better to send him on and allow him to "get what he can out of the next grade." Investigations of elimination and retardation made during recent years may have been a cause of this tendency. Teachers, principals, and superintendents feel that they must have a low percentage of non-promotion, which means pushing along pupils who otherwise would have remained behind. On the other hand, the bright pupil is held back to conform to the place set by the average. He is just as seriously mal-adjusted as the dull one. The only difference is that in later life the bright child may have the ability to overcome the handicaps which the school system has imposed upon him, whereas the slow child cannot.

ECONOMIC FACTOR NOT AN IMPORTANT CAUSE FOR LEAVING SCHOOL

One of the important facts brought out in this investigation is that economic condition is not an important cause of pupils leaving school to go to work. Only 6 per cent gave this as a reason, and in every case except one a careful investigation revealed that this was not the cause. The parents were perfectly able to keep the boy or girl in school. These children did not have to contribute to the support of the family or to their own maintenance. The real reason for leaving was a lack of adjustment by the school system due to their too high or too low mental ability. This same conclusion was drawn by Mr. Young in the Denver investigation. He says: "The outstanding reason why these boys and girls left the ordinary public schools is that they could not do the regular work that is required. . . . Contrary to the generally accepted belief, the primary factor in children's leaving school is not economic. In this study those withdrawing because of the economic reason proved to be only a very small per cent of the total number."¹

SCHOOL SYSTEM DEFEATING ITS OWN ENDS

It is very apparent from the evidence presented that, for those pupils who leave school at these ages to take positions, the school system is defeating its own ends. Information is not the end of education. It is only the means by which the end may be achieved. The end is to build up, within the individual, right ideals or attitudes toward his social, economic, moral, and avocational life so that he may be efficient in these fields. Ideals or attitudes which contribute toward this end are initiative, responsibility, ability to think, sympathy, honesty, thrift, coöperation, ability to see the other fellow's point of view, willingness to give an honest day's work for

¹ Young, G. P., *op. cit.*, p. 24.

an honest day's pay, and many others. These are the things that should come as the results of public education. The boys and girls who leave school to go to work, however, are not being trained in these ideals, but in just the opposite ones, such as lack of initiative, lack of responsibility, inability to think, lack of sympathy, lack of thrift, lack of coöperation, and so on. They see other boys and girls given a square deal which they have not had. Many of them leave with an actual hatred for our whole educational system. The interesting part of it is that this happens in a democracy where education is the backbone of the nation, where we are pleased to believe that everyone has an equal chance, and where we tax everyone on the same basis to support this equal educational opportunity which does not exist. The pupil expects bread; we give him a stone.

Boys and girls leaving school under these conditions take the first position available. They make no attempt to discover their interests and aptitudes, or to weigh the advantages and disadvantages of different occupations as to the possibility of future promotion. Consequently, about all the continuation-school pupils examined in this investigation were in poorly paid, blind-alley jobs, which offered no possibility for future growth. The length of time a boy or girl holds a given position is so short that in many cases it is impossible to tell from month to month what the job will be. In a Massachusetts town for the year ending June 30, 1920, the writer studied the number of different jobs held by 14-to-16-year-olds, as determined by the employment certificates issued by the attendance officer. The number included 134 boys and 68 girls. He found that the range was from one to six jobs for boys and one to five for girls. The median for both sexes was two. This was at a time when the industries in this particular locality were running on full time and war-wages were still in force, so there is every reason to believe

that the stability was better than would be found under normal conditions.¹ The latest report of the Children's Bureau of the United States Department of Labor shows that 24 per cent of the boys and girls who leave school at these ages give up their first position within three months.²

The training given by the school system in ideals and attitudes detrimental to success, plus a further habitualization of these through numerous try-out jobs, gives to boys and girls a handicap which few are able to overcome. They drift on until finally home responsibilities become such that they must have the income of the present position, and cannot afford to take the chance of another move. Snedden says that nearly 90 per cent of all the adult workers of America find their vocations and receive their training in some such pick-up way.³ Some of them become maladjusted industrial cases, and find their way into our psychopathic hospitals and other institutions. Most of them are in positions unsuited to their interests, abilities, and capacities. This vocational unhappiness affects their home life and all social, civic, and avocational contacts. Society pays the penalty in decreased social efficiency. If society must pay the bill anyhow, how much better to do it in the beginning; see to it that these boys and girls have an equal educational chance, by sending them out equipped with the right ideals, attitudes, habits, and skills, and by helping them to secure positions where they have possibilities of happiness and success.

¹ These figures vary little from those furnished the writer by E. J. Goulart of the Boys' Continuation School, Cambridge, Mass.

² In *Our Boys*, which is a study of 245,000 employed boys of 16, 17, and 18 years in New York State, it is shown that 20 per cent had one job, 25 per cent 2 jobs, 25 per cent 3 jobs, and 10 per cent 10 jobs in a year. These boys are beyond the ages of those in the present study. There is every reason to believe that the variability of 14-to-16-year-olds would be greater than the figures given here. In the city of Denver, Colorado, for the year 1923, it was found that 66 per cent of all boys 14 to 16 years of age, who left school to go to work, changed jobs within the first three months. Girls were more stable, only 33 per cent having taken new positions during this same period.

³ Snedden, David, "*Educational Sociology*," p. 624.

CHAPTER XI

SUGGESTIONS FOR IMPROVEMENT

PUBLICITY NEEDED

THE first step in the improvement of present conditions is to publish the facts. It would seem from the evidence that school administrators, boards of education, teachers, and the public at large are little aware of the fact that there is a relationship between low mental ability and withdrawals from school; that our system as at present organized is making little attempt to differentiate for the slow and bright pupils; that it really is trying to put the common stamp upon all; and that the fundamental aims for which it exists are not being achieved. All of those connected with school work have been very well satisfied to believe that these pupils left school because of economic necessity, the demands of industry for cheap help, or some other reason which left no implications upon the school system but gave it a clean record of efficiency. The time has now come when the facts must be faced. In the days when Horace Mann was confronted with the serious problem of the inefficiency of the common schools, he began a relentless campaign of publication of the facts. The result was the rallying of educators and public to the common cause of improvement, and the old Bay State, within a comparatively short period of years, developed the highest and most efficient type of common-school education then in existence. This same method of treatment is needed in the present situation.

RECLASSIFICATION THROUGH INTELLIGENCE TESTS

The second step in improvement is to have a reclassification of all pupils on the basis of intelligence tests. For years, administrators and teachers have recognized the fact that pupils have differed in their ability to do school work. Their judgments, however, have been based upon school records, examinations, personal opinion, and many other factors of a subjective nature in which there was a possibility of variation. Recent educational experiments have shown the unreliability of such ratings.

The writer has had some interesting experiences showing how teachers' judgments are affected by outside factors. A girl in the 7th grade had been receiving good marks all through her school career. An intelligence examination showed that she had exceedingly low mental ability. Then a careful record of her school work over a period of two months following indicated that she was not passing. How, then, account for the previous good grades? Investigation showed that her father owned a large fruit farm and was accustomed, each fall, to make quantities of cider. The girl, from the time she entered the first grade, had been in the habit of supplying her teacher with a gallon of cider each week throughout the school year. All the teachers said this had not affected the grades given the child. However, as soon as attention was called to the possibility, the grades changed, and later the child was placed in a special class for backward children.

In another instance of good marks and low mental ability, as determined by the intelligence tests, the writer placed the facts before the teacher and asked for an explanation. The answer was that the intelligence rating must be wrong and the school grades correct. When asked her reason for this statement, the teacher said, "Well, you see, his mother is a graduate of our State University and his father is president

of our local national bank." This boy, also, went into a special class. That there are boys and girls with high mental ability who are doing very poor school work is shown by a number of instances given in Chapter VIII. At the present time there are many well-constructed intelligence tests which eliminate these personal, subjective factors and give a rating of each pupil on an objective basis.

Again, the classification of pupils through intelligence tests ought to come very early in their school life, certainly not later than the middle of the first year. There have been some attempts in the past to classify pupils on the basis of teachers' records, etc., and some elaborate plans of differentiation have been worked out. The trouble in all these cases has been the fact that the schemes were either unworkable, as the Pueblo plan; came too late, as the Cambridge plan; or were merely devices for giving extra help to backward or bright children, as the Batavia and North Denver plans. A real scheme of classification must begin before the child has built up bad habits due to lack of school adjustment. It must also make provision for at least three groups, superior, average, and inferior, with definite feeble-minded cases segregated in special classes.

An excellent illustration of a method of classification which comes too late is shown in Chapter 277 of the Acts of 1919 of the Legislature of Massachusetts. This law provides that children of compulsory school age who are three or more years mentally retarded shall be placed in special classes and given special instruction adapted to their mental attainments. The regulations for determining the number of children three years retarded in mental development, as published by the Massachusetts State Board of Education, state:

"It is suggested that one or all of the following methods be employed by school officials in selecting the pupils to be *examined* for admission to the special classes:

"1. Select by reference to individual school records those pupils who have repeated two or more grades.

"2. Select those who, failing to earn promotion two or more years, have been allowed by the school officials to advance with their grades as being for their best interests.

"3. Select those who by an age-grade table are shown to be retarded in their school work two or more years."¹

The above regulations emphasize the fact that in order for a pupil to be examined for a special class he must have repeated two or more grades. Even then there is a chance that he *may not pass* and may thus be sentenced to further education of the wrong type. How much better to have examined the boy or girl during the first school year, and saved these years of non-promotion and failure by giving work adapted to the mental capacity in the beginning.

Before leaving this point, we wish to emphasize the fact that a classification on this basis does not make for a caste system. Such a system means that an individual is born in a certain social group where he must remain, live, and die without any opportunity to rise above it. If condemning an individual to a certain group from which he can never rise regardless of ability, or condemning an individual to a certain task which he can never do because he does not have the ability, is fundamental in the caste system, then we certainly have had an educational caste system in the past. What we need to do is to get away from this and give everyone an equal chance to develop himself in proportion to his ability and capacity for development. The plan advocated here provides just such an opportunity for every child.

¹ *The Commonwealth of Massachusetts: Regulations for Determining the Number of Children Three Years Retarded in Mental Development*, p. 5.

NEW SCHOOL CURRICULUM NEEDED

We need to develop a new school curriculum adapted to the intelligence level of the individual. Our present elementary and secondary school curricula are loaded with subject matter whose only excuse for existence is that it bears the imprint of tradition. It is extremely amusing to hear some people argue that these materials were good enough for our grandfathers, therefore they must be all right now. If these same people were consistent, they would also argue for a return of the ox-cart, the prairie-schooner, candles, or kerosene lamps; they would abolish all the developments in social and industrial life that have come during the past generation. What we need for our normal children is a rebuilding of the present curriculum based upon present social, industrial, economic, and avocational needs. Then we must parallel this on either side with one constructed for those who are above or below normal. Many progressive cities and towns throughout the country have already begun such a program of reorganization.¹

In the development of these curricula we must recognize the psychology of the child. The mentally retarded pupil, for example, needs a longer time in which to do a given piece of work than the normal child. This statement can be easily verified by consulting teachers who have had experience with such groups.² The results of the experiment in the army with the Alpha test, summarized in Chapter I, give a scientific weight to this point. All the type-methods of school-organization, stated above, recognized it. The Opportunity

¹ For example: Oakland, California; Detroit, Michigan; Denver and Trinidad, Colorado.

² Mr. H. W. Zirkle, principal of the Whittier School, Denver, who has made a very careful study of these children and who has developed in his school some of the best methods of dealing with them to be found anywhere in the country, recently confirmed the above statement.

School in the city of Denver is organized with this point in mind, and pupils state that they like the work there much better than in the regular school, because they are allowed more time in which to do it. What is of more vital importance, however, is that we must recognize the fact that these low-grade children can be taught the same ideals and attitudes as normal or superior children, only it must be done through a different type of subject matter. The material for the school curriculum must be an outgrowth of the experiences of the children. The child with limited intelligence has built up experiences of a very definite, concrete nature with practical materials. He must see the use of things now. The normal or superior child, however, may be just as much at home with indefinite, vague, or abstract materials. He can recognize a goal far in the dim future. Our school systems have been giving slow children material designed for these brighter ones. The necessity for this change is obvious.

VOCATIONAL GUIDANCE NEEDED

The school system must develop a comprehensive system of vocational guidance that will help each boy and girl choose, prepare for, enter into, and make a success in a vocation. That there is a relation between intelligence and occupation is indicated by the results of the Alpha test in the United States Army.¹ These showed that the range of intelligence of the middle 50 per cent of the different occupational groups was as follows:

	Median	Middle 50 Per Cent
1. Unskilled labor.....	35	21 to 63
2. Semi-skilled	42	23 to 70
3. Skilled	61	26 to 95
4. Business and Clerical	96	58 to 145
5. Professional	140	98 to 184

¹ "Army Mental Test Methods, Typical Results and Practical Applications"; Washington, Government Printing Office, 1918.

Our school system, by the very nature of its organization, has been helping boys and girls of normal intelligence or better to select, prepare for, and enter into the business, clerical, and professional fields. But has it been equally careful in making provision for those of lower intelligence, who would probably fill the skilled, semi-skilled, and unskilled positions? The answer is an emphatic no. Here again the hand of tradition is seen. Somewhere within the school system we must help these boys and girls to discover their vocational interests and aptitudes and make tentative choice of their life-work; and, if they must leave school, we must see that they are placed in positions leading toward their ultimate goal. The evils of the present system of try-out jobs and chance selection will then be eliminated.

SCHOOL MUST TRAIN IN SUCCESS

Finally, the school must train in success. One of the strongest stimuli for attacking a new and larger problem is the courage which develops from a smaller one well done. Success begets success, failure begets failure. The school has been developing failure qualities in those who drop out early. We must see to it that there is no such thing as non-promotion and failure, but that each individual progresses onward and upward, regardless of how great or little his progress may be. We must train boys and girls to fix their eyes upon the road ahead. We must see to it that the highway is broad and smooth, not filled with the mud-holes of uncertainty and disappointment. Then there will be no turning back, and the exhilaration which comes from having achieved his goal will be the reward of everyone. The broader responsibilities of life will then be attacked with fresh vigor and new purpose; and many of our social, economic, and industrial problems, in so far as they are the result of training children in failure, will rapidly find a solution, for American education will be coming into its own.

